THE ARCHITECTURAL RECORD

SEPTEMBER · 1913

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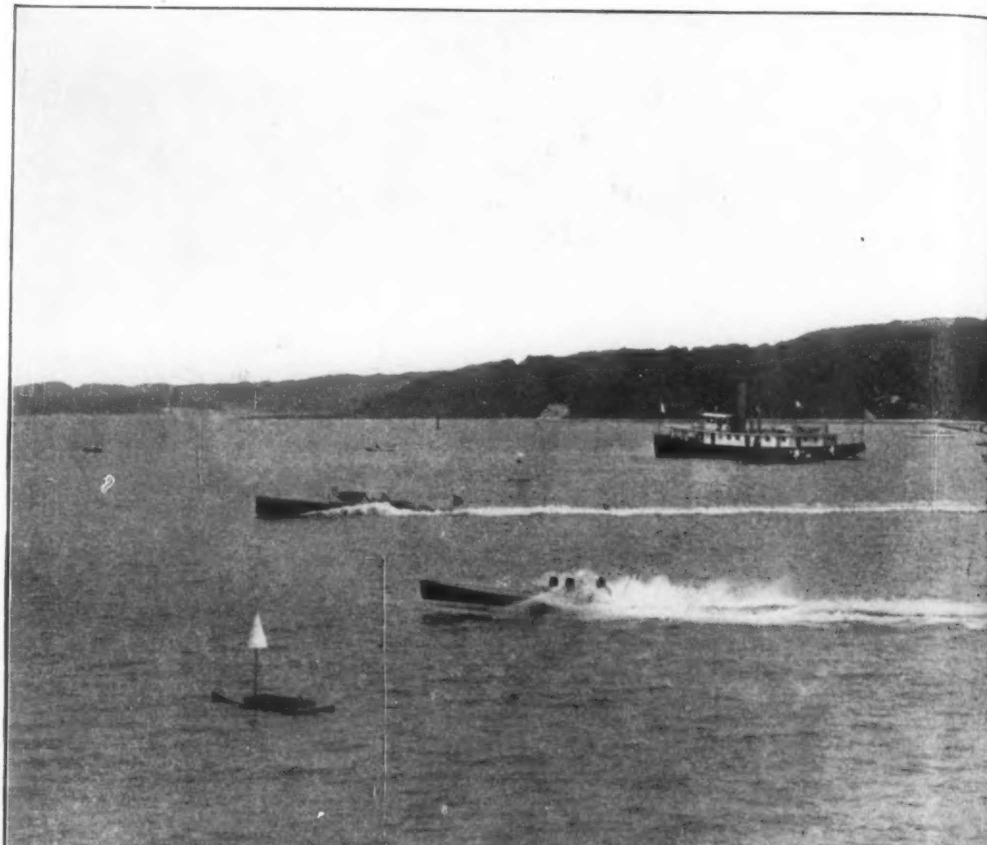

INTERNATIONAL MOTOR BOAT RACE — DIXIE vs. DEN.

THE ARCHITECTURAL RECORD

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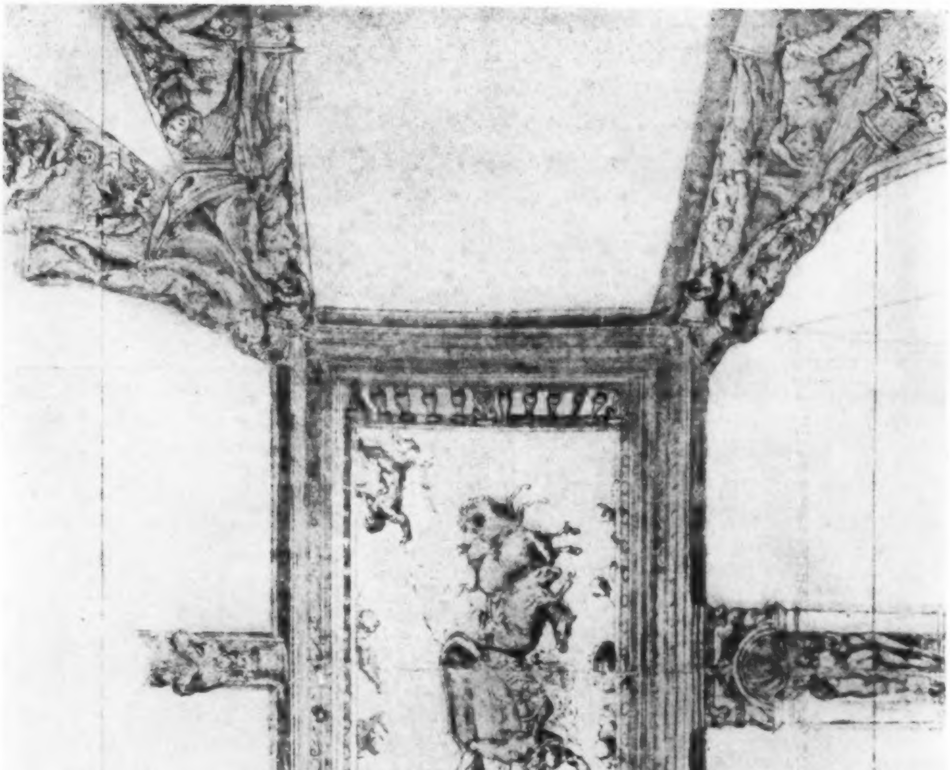


From a Drawing in the Uffizi Gallery.

A CEILING DECORATION, DRAWN BY BALDASSARE PERUZZI.

THE ARCHITECTVRAL RECORD

SEPTEMBER, 1913

VOLVME XXXIV NVMBER III

THREE DIMENSIONS IN ARCHITECTVRAL DRAWING

THE LESSON OF THE ITALIAN MASTERS

BY ARTHVR G. BYNE.

THAT THE architects of the Renaissance were often painters and sculptors as well needs no emphasizing here, except in so much as it may explain why their architectural draughting is more interesting than that done to-day. The objects peculiar to architectural ornament have not changed since the old days; but the architect's training, materials and instruments have, as was inevitable. Greater attention (perhaps undue attention) is paid to-day to the technique of draughting. It has become a highly specialized art in itself that has evoked a long list of mechanically perfected instruments. The draughtsman in competitions submits to juries drawings that are amazingly clever and "finished," and this "finish" has become such a looked-for convention that a re-incarnated Bramante or Sansovino with his freely-interpreted drawing on much bescribbled paper would have no consideration at the hands of the jury even were his scheme never so clever.

The reason for this concentration on draughting to the point that one who excels in it can command a high remuneration (as remuneration goes in the profession) is obvious. The day is long passed when the architect could make a free and spirited drawing, knowing that it would be properly interpreted by capable and sympathetic artisans. The present-day lack of these latter makes it imperative that the minutest details be painstakingly drawn out in the architect's office (hence the great office force necessary for a busy firm). This passing on of the one drawing from designer to subordinates is the first step towards robbing it of sentiment. Next, ornament may almost be said to have become standardized. Every important office has a good collection of architec-

DRAWING FOR A FOUNTAIN HEAD.
By Agostino Carracci.

tural books and photographs, from which sources details are taken bodily and therefore lack the variety they might have had if they had been studied at first hand by the designer.

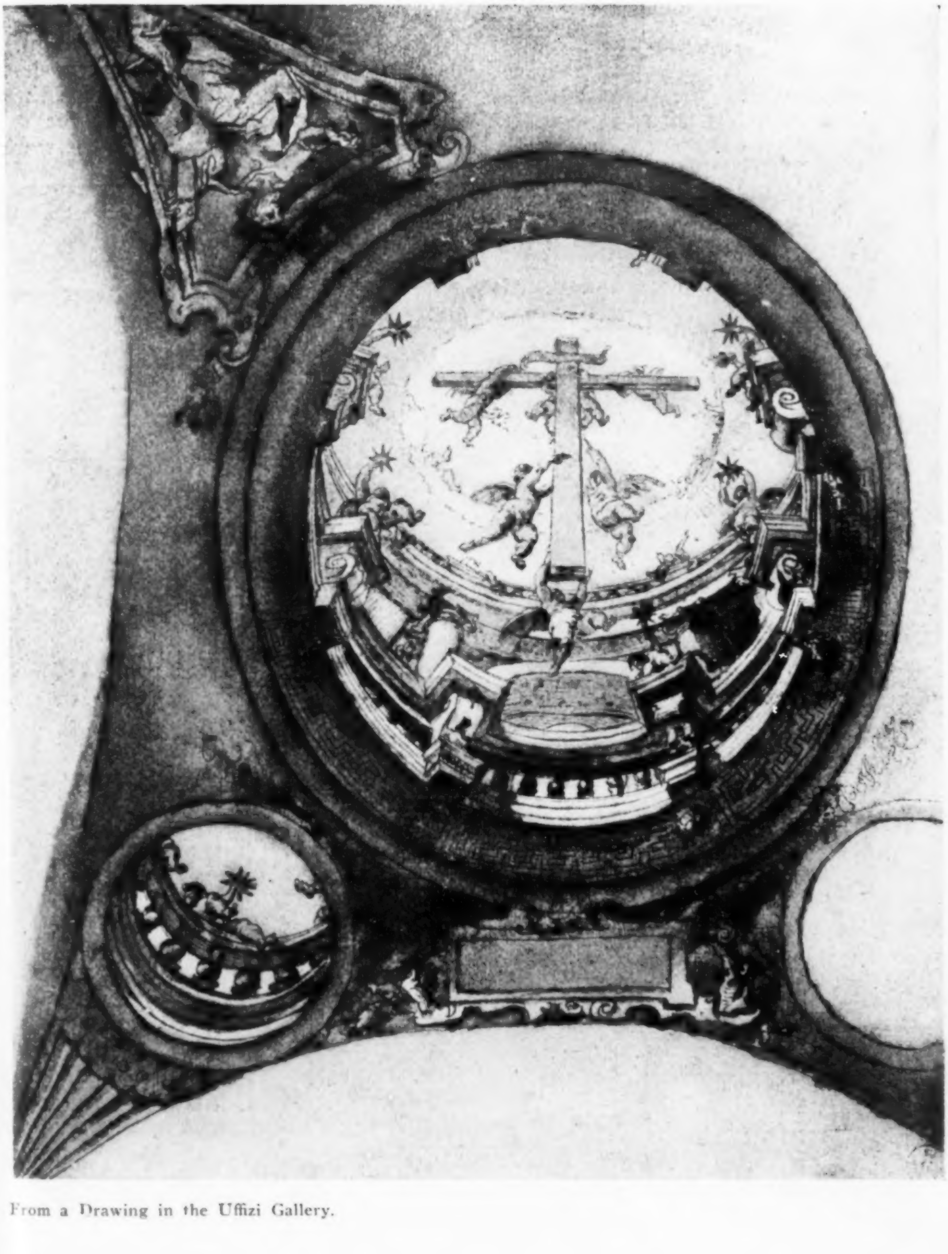
Although a man of judgment and talent often does incorporate old details into an admirable design, if his drawing is shown to the *nouveau* as a type to follow, his attempt at doing so not only lacks the animation of his model, but he is apt to miss entirely the sentiment that inspired the old originals. Often it is merely *clever* modern draughtsmanship that is held up as worthy of imitation, and this the tyro is apt to confuse with good design. He cannot discern that it is, in the last analysis, little more than the knack of exaggeration—of emphasizing some part which has in reality but little importance just for the sake of showy drawing; he cannot see that if this sparkling delineation were actually carried into execution it would not only lack sentiment and conviction, but would probably be cheap and meretricious architecture.

I remember visiting a newly-finished Christian Science Church some years ago with an architect whose beautiful and sympathetic delineation of Italian ornament had made him an authority on the subject. The "Christian Science" ceiling, massive and richly coffered, had been much talked about. As he stood studying it he turned to me and said: "Can't you just imagine what the drawing for this ceiling looked like? Can't you see the clever spotting on the paper, the lines all beautifully crossed and each one ending in a dot? The whole thing, in fact, just dripping with dots?"

We all know this dot-and-dash stage referred to, so alluring to the student. Whether, even in student days, it is worth acquiring is doubtful; in any case it is well to drop it as soon as one has acquired it. To learn to control a strong firm line should be the aim. If, in passing from the wriggly, fuzzy sort of line to the firm sort the dot-and-dash is a necessary transitional stage, it should not be dwelt on and cherished as the desideratum.

The many instruments now available for draughting are another factor that militate against its interesting qualities. The student does not wait till he has become expert at free-hand work, but aims to possess an expensive outlay of instruments the moment he enrolls in an architectural school. Therefore, instead of

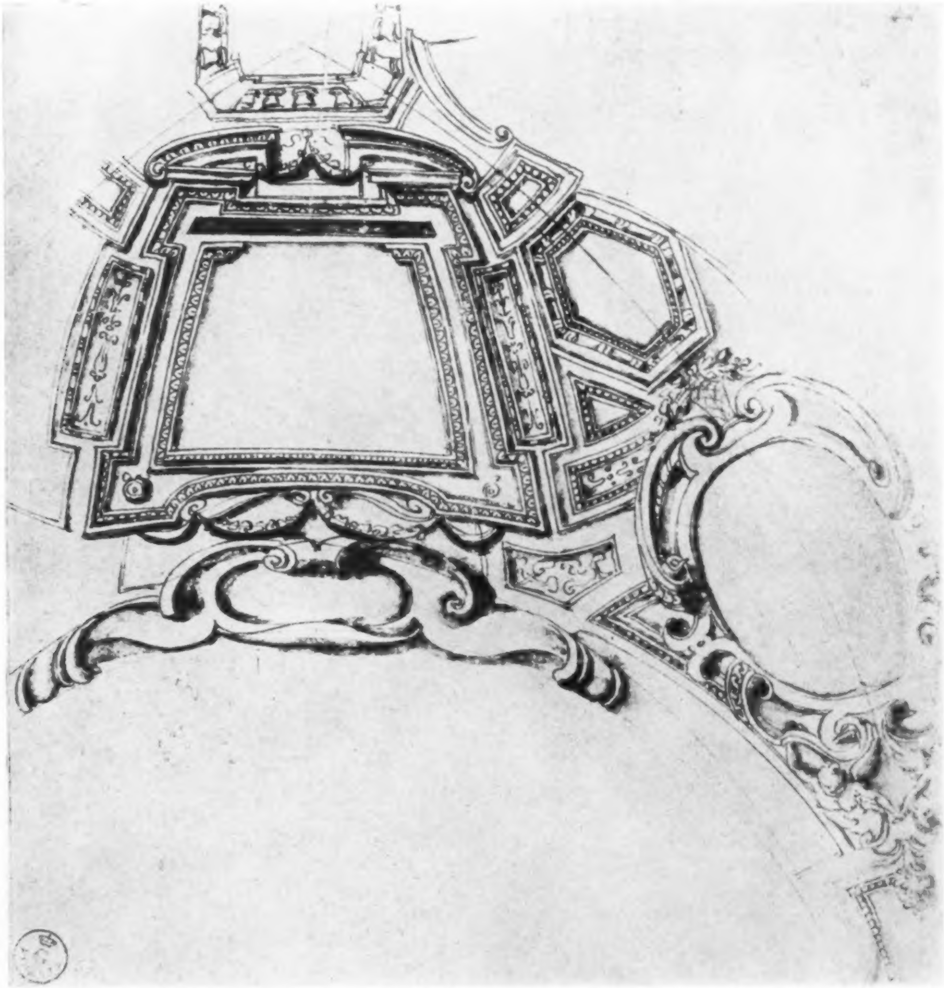
DRAWING FOR A FOUNTAIN HEAD.
By Giulio Romano.



From a Drawing in the Uffizi Gallery.

DECORATION FOR A CUPOLA.
DRAWN BY CHERUBINI ALBERTI.

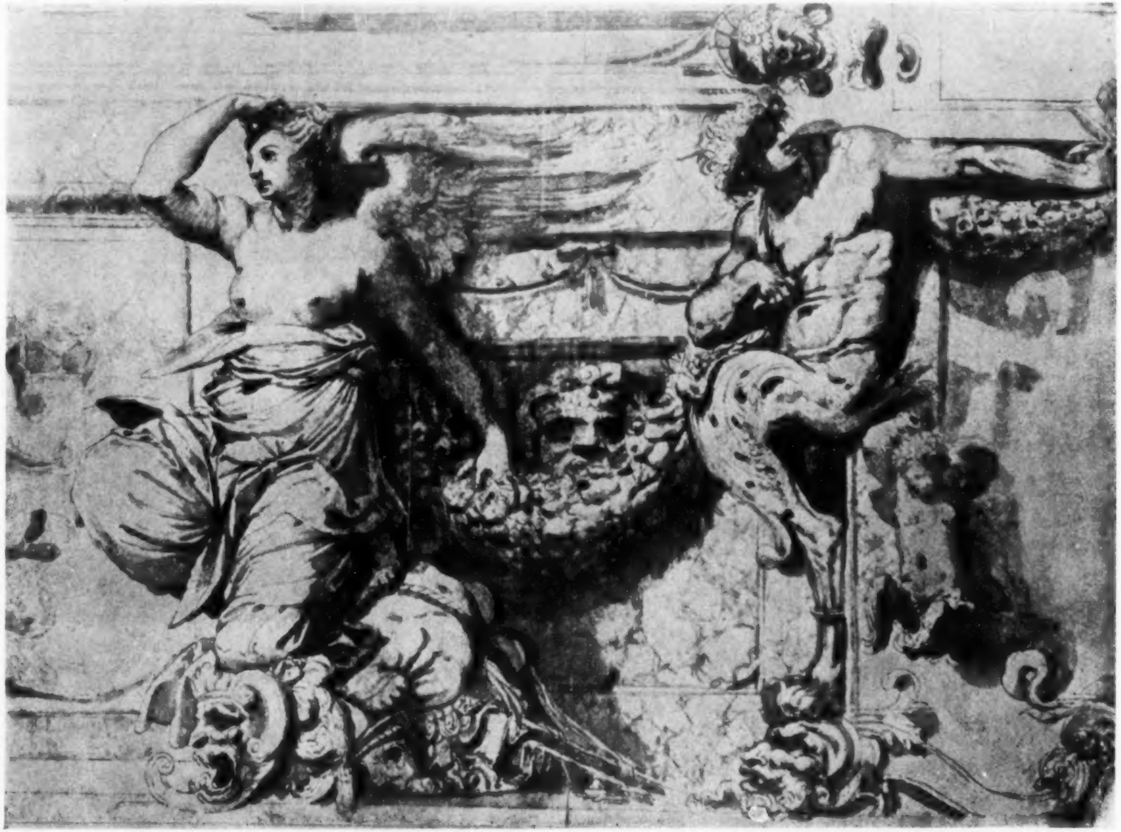
using these judiciously as an adjunct to free-hand work, he uses them almost exclusively and looks upon whatever free-hand training the school insists upon as more or less of a bore; unless, of course, he has some special talent for work will not do. Then the need of a little training in drawing from nature is sorely felt. They wish they had studied more from life; they wish they had studied ornament in the three dimensions; or at least they wish the work



DRAWING FOR QUARTER OF A VAULT.
By an unknown architect of the 17th century.

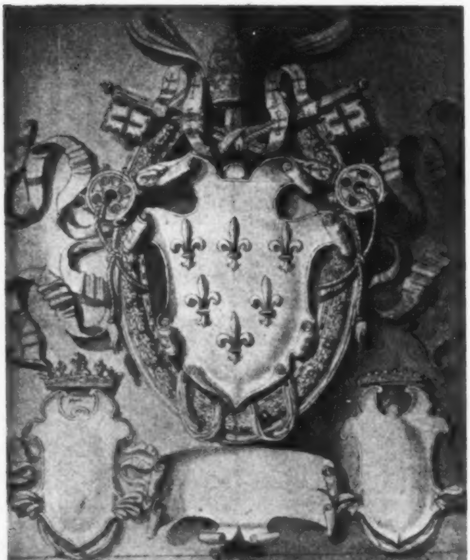
it. To what an extent expert instrument draughtsmen "fall down" when required to express themselves without mechanical aids is often painfully visible in their large-scale and full sizing, where the mere knack of indication that passes muster on small-scale of those early masters who did do these things had been brought more often to their attention.

And this is the point: Might not the schools, instead of displaying around their rooms so plentifully the huge *projects* of Paris scholarships which though



AN ARCHITECTURAL DECORATION,
DRAWN BY FRANCESCO SALVIATI

CONFLICT BETWEEN A DRAGON AND A LION.
Drawn by Leonardo da Vinci.



A DRAWING OF PAPAL INSIGNIA.
By Antonio da San Gallo.

clever in the extreme, encourage mainly a sort of paper architecture—instead of these might not the plan problems and fugitive detail drawings of the early architects be displayed? Such models for study and imitation would undoubtedly result in an honest straightforward presentation rather than a merely *chic* indication. Even juries are beginning now to discriminate between the two. Students should do the same.

By an honest presentation is meant that sort of drawing that endeavors to approximate what a subject will be when executed. To do this one must consider the third dimension just as seriously as the breadth and height. This principle is just as applicable to detail as to the whole. By keeping in mind, for instance, the relief or depth of the ornament the draughtsman could take greater latitude in the other dimensions and thus a motif which might be very much out of scale in high relief might be in perfect scale in low relief, even though it covered a greater square area. One can prove by his own observation

that much of the *naïvete* and charm of the Renaissance egg and dart moulding is due to its being out of scale so far as its breadth and height is concerned, but brought back into scale by the diminution of the relief. Of course, in an example as simple as this the shadows play an almost negligible part; but in a more complex example, unless these were studied carefully, the motif when executed might be an unpleasant surprise.

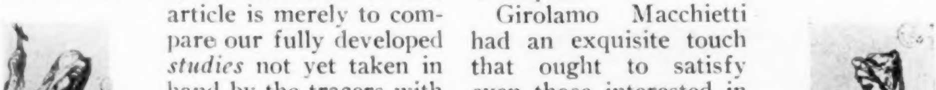
This study of the shadow, this modeling on paper, is well illustrated by the accompanying drawings from the splendid architectural collection in the Uffizi, in Florence. One feels, in every instance, that the draughtsman knew how he wanted a thing to look when finished and in place. Every motif was studied in the right manner and honestly put down on paper. Of course, a modern might justly say that as these architects were aided by that extinct genius, the accomplished artisan, who did not need a hard and fast working drawing to go by, it is unfair to compare our drawings with theirs. But the intention of this article is merely to compare our fully developed *studies* not yet taken in hand by the tracers with these old-time ones, and to see if we might not do well to look at a motif in the same way while traversing the stages that lead up to the finished working drawing. It is interesting to note that most of the examples shown are either in semi- or in geometric-perspective. The advantages of this method are never disputed, but the additional labor it entails has made it unpopular in our busy modern practice.

While these illustrations speak for themselves, to point out a few of the salient characteristics of the various masters might not be amiss to the student.

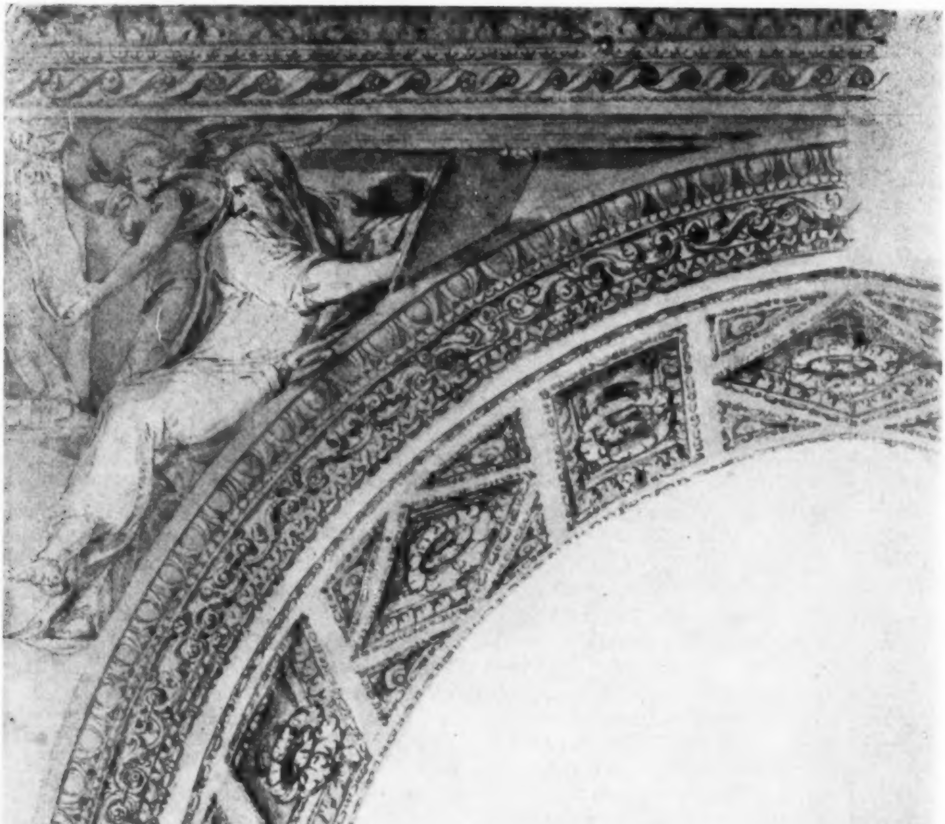
Baldassare Peruzzi, who is tardily being recognized as one of the greatest architects of the Renaissance would hardly get much applause as a brilliant architectural draughtsman to-day. His jottings on paper look almost careless, yet the work executed from them was brilliant. Not a moulding of his chef-d'oeuvre, the Palazzo Massimi in Rome, but is restrained and of delicate profile, and that he intended it to be so, that he visualized it as such, is evident even in these loose sketches. Antonio da San Gallo the Younger it will be seen was more architectural as we understand it, yet even he has modeled his drawing very completely. This specimen hardly does him justice, however, and those interested could find far more brilliant examples.

Girolamo Macchietti had an exquisite touch that ought to satisfy even those interested in draughting only for draughting's sake. But he had much more besides. To the charm that a painter gives to the figure, he adds an architectonic feeling that marks it at once as both decorative and structural, and its author as a master to keep in mind.

The quarter of a vault drawn by an unknown Seventeenth Century architect is an admirably lucid presentation of a



DRAWING FOR A TAPESTRY BORDER.
By Lodovico Cigoli.



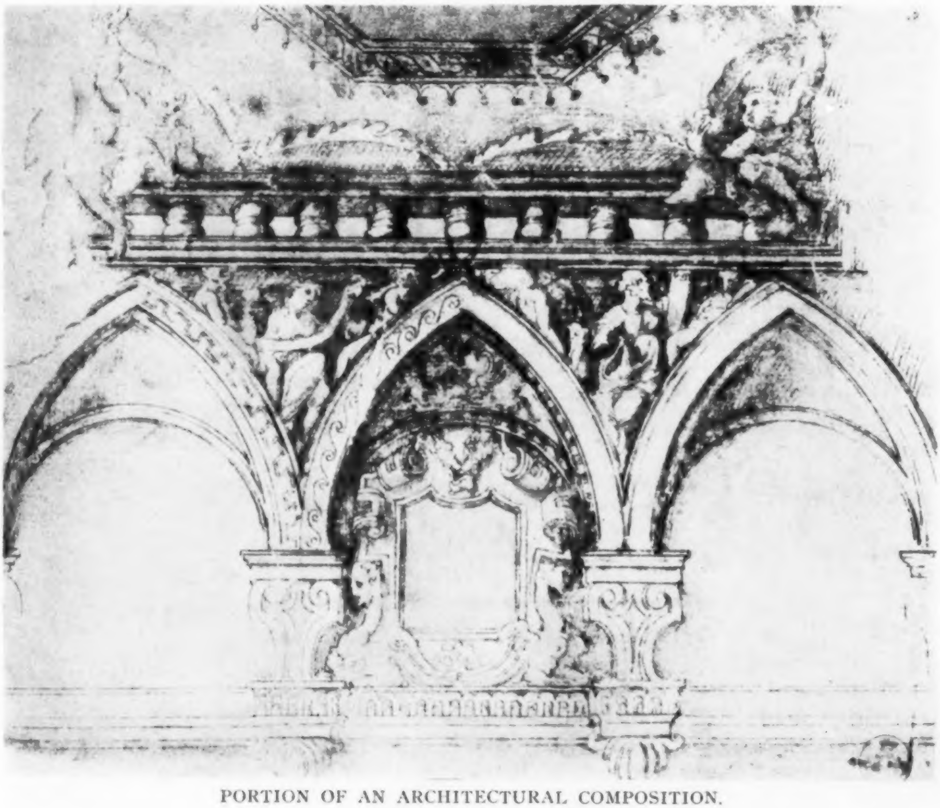
From a Drawing in the Uffizi Gallery.

SOFFIT AND SPANDRIL
DRAWN BY BALDASSARE PERUZZI

motif difficult to express, and might suffice as a working drawing for even less capable builders than those of his century.

Cherubino Alberti shows a wonderful working knowledge of perspective. Giulio Romano, the architect-decorator who embellished the famous Villa Madama, made drawings that were unrestrained and full of fantasy yet strictly architectural.

Benvenuto Cellini and the great Leonardo da Vinci, though not architects, had each an unlimited store of decorative detail at his command. Leonardo committed every thought to paper with his own peculiar technique, saints, dragons, models for flying machines, and even the most mechanical drawings, for these last have a free artistic quality which might be profitably brought back into draughting to-day.



PORTION OF AN ARCHITECTURAL COMPOSITION.
Drawn by Giovanni Battista Cremonini.

FRONT ELEVATION—MAUSOLEUM OF O. H. P. BELMONT, ESQ., WOODLAWN, N. Y. HUNT & HUNT, ARCHITECTS.

INTERIOR—MAUSOLEUM OF O. H. P. BELMONT, ESQ., WOODLAWN, N. Y.
Hunt & Hunt, Architects.

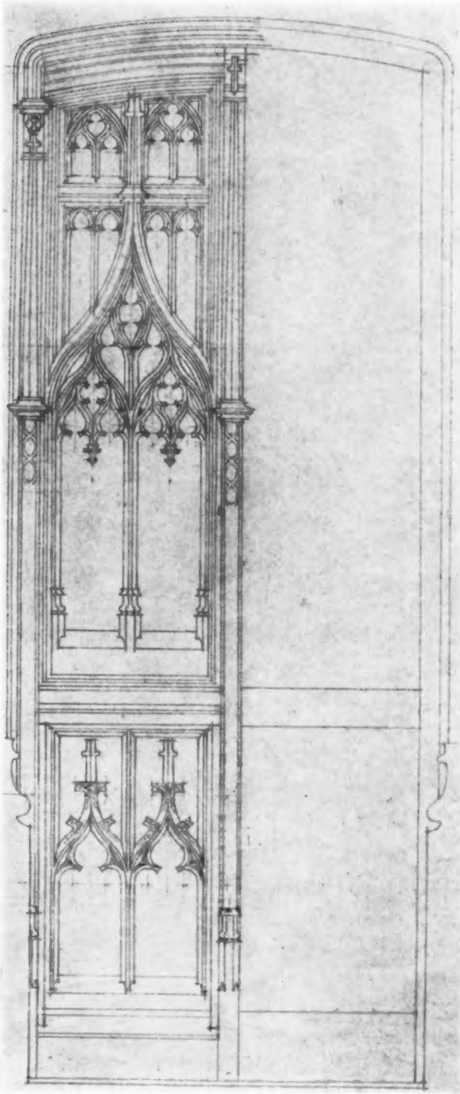
A REVIVAL OF FRENCH GOTHIC ARCHITECTURE

A MAUSOLEUM AFTER ST. HUBERT'S CHAPEL
HUNT & HUNT ARCHITECTS.
BY L. R. MCCABE.

SAINT HUBERT'S Chapel of Amboise—a mediæval architectural gem of Southern France—has now a counterpart in New York's costliest City of the Dead—Woodlawn Cemetery. To the passing world this counterpart is known as the Belmont Mortuary Chapel. It is Mrs. O. H. P. Belmont's memorial to her husband who is interred there, and is the prospective resting place of the mother of the Duchess of Marlborough.

The chapel, which has been some time in construction, was opened last fall to the public. The story of its design should prove practically suggestive to makers of the beautiful, and scarcely less interesting than the history of its architectural forbear, for centuries the joy of artists and the delight of tourists in Southern France.

To have bodily transported to Woodlawn Cemetery, the original Saint Hubert Chapel, would have been hardly less Herculean a task than is the achievement of the architects, Messrs. Hunt and Hunt, in readjusting this mediæval Gothic masterpiece to New World setting, without sacrifice of its storied feel-



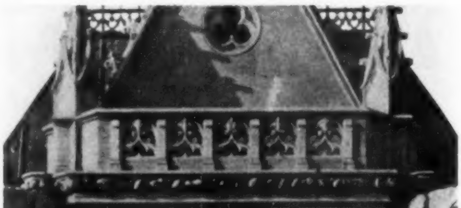
DETAIL—MAUSOLEUM OF O. H. P. BELMONT, ESQ., WOODLAWN, N. Y.
Hunt & Hunt, Architects.

ing, haunting beauty of line, perspective and color.

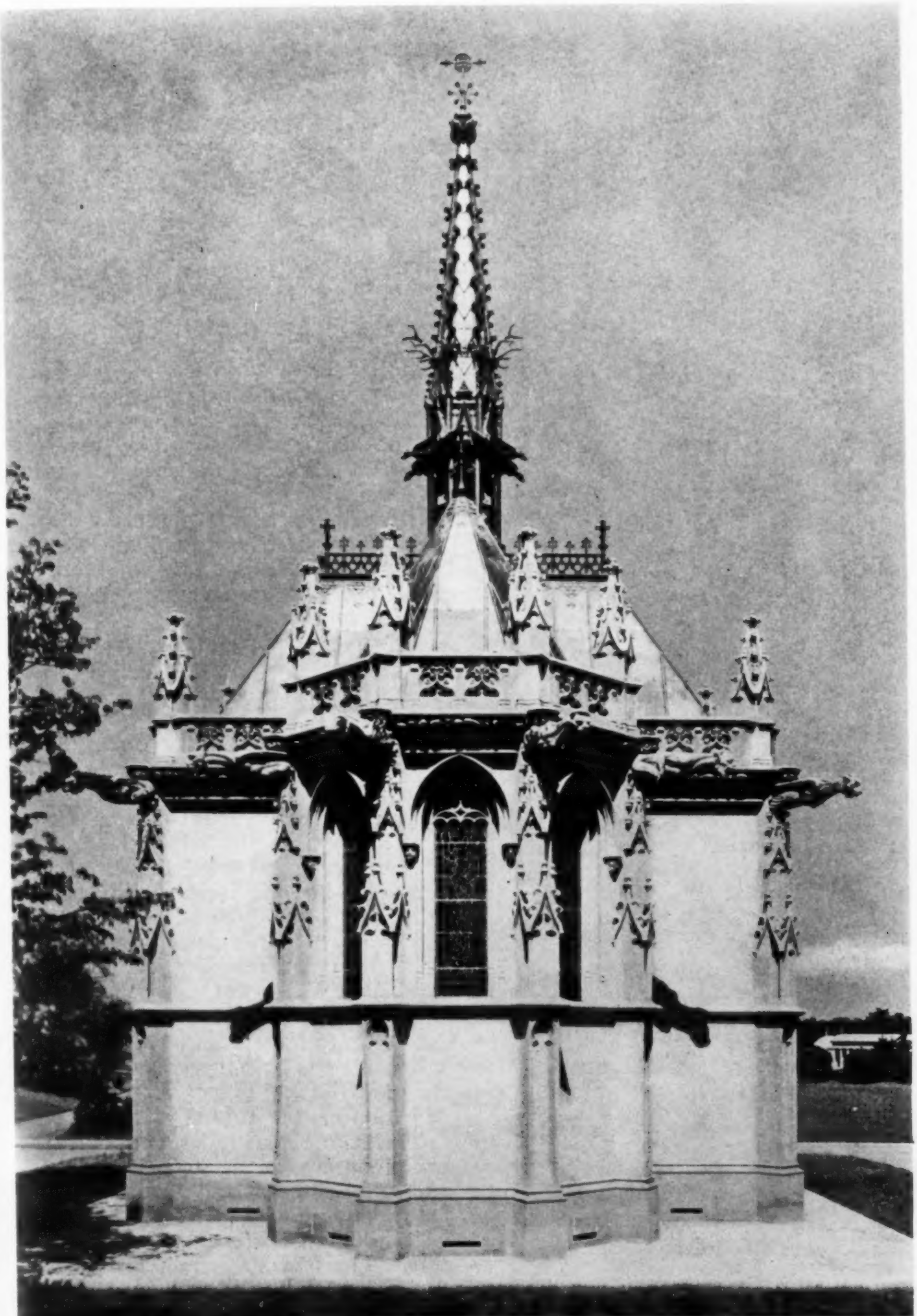
Saint Hubert's Chapel dates from the end of the fifteenth century. It was built in the reign of Charles VIII., and adjoins the historic Château d'Amboise, which King Charles converted from a formidable fortress into a palace.

Saint Hubert's Chapel at Amboise is supported by a projecting rock which serves as a *contre-fort* to an immense terrace, which separates the chapel from the Château at a height which dominates the entire city of Amboise, and the Valley of the Loire, and commands a distinct view of the town clock of Tours. From earliest times the forests of Amboise were given over to royal hunts, which doubtless accounts for the chapel's dedication to Saint Hubert, despite this patron of the chase was of German origin. The chapel's decoration, as befits its patron, is rich in symbols of the hunt. Additional interest lies in the fact that as late as 1878, the bones of Leonardo da Vinci, who died at Amboise, were moved from a neighboring chapel and deposited in Saint Hubert's.

Sentiment, no less than appreciation of its architectural beauty, prompted Mrs. Belmont's choice of Saint Hu-



ENTRANCE DETAIL—MAUSOLEUM OF O. H. P. BELMONT, ESQ., WOODLAWN, N. Y.
Hunt & Hunt, Architects.



APSE ELEVATION—MAUSOLEUM OF O. H. P. BELMONT, ESQ., WOODLAWN, N. Y.
HUNT & HUNT, ARCHITECTS.

MEMORIAL WINDOW—MAUSOLEUM OF O. H. P. BELMONT, ESQ., WOODLAWN, N. Y.
Helen Maitland Armstrong.
Hunt & Hunt, Architects.

bert as the model from which the architects, with characteristic scholarly pains and ripe skill, have evolved this memorial mortuary chapel at a cost variously estimated at three hundred thousand dollars. The late O. H. P. Belmont was an ardent follower of the hounds, in consequence, Saint Hubert's Chapel was his favorite of all the architectural beauties of Southern France.

The Belmont Chapel stands upon a slight elevation within the West gate of Woodlawn Cemetery—the stag horns and gargoyles of its graceful spire forming a dominant architectural note among the other mausoleums.

The chapel is built of limestone. In introducing limestone, the architects establish a precedent, since heretofore, Woodlawn mausoleums and monuments have been restricted to marble and granite. This restriction was founded upon the Trustee's belief that they are the only materials impervious to the havoc of time and weather.

The interior of the chapel is cement. The ground plan is the Greek cross. The structure rises sixty-five feet from the grade. A spire, preserving the exquisite design of the original, crowns the Gothic roof, while the front façade is rich with delicately executed bas relief detail. The subject of this decoration, carved out of the solid limestone, is the conversion of Saint Hubert—a veritable hunting scene with spirited horse, stag and hounds. This bas relief is above the double bronze doors.

In the tympan above this decoration is another bas relief, a large composition divided into three sections, representing, as in the original Charles VIII and Ann of Brittany, his wife, prostrated at the feet of the Virgin, carrying in her arms, the Infant Jesus.

The roof, balustrades and buttresses are profusely ornamented in carved lace and interlaced designs, while from every buttress jut the gargoyles, characteristic of this type of French Gothic architecture. The interior is rich in low relief decoration, following the conformation of the choir.

The vaults are on either side of the chancel—in the transepts or arms of the

cross, as it were. They are covered by rectangular slabs of old ivory marble, carved and pierced in a conventional design of laurel and berry, which rises some six inches from the chapel floor framing the slab. Leaf and berry are painted in natural colors. On each slab carved in low relief and also richly blazoned, are the coat of arms of the respective families. Projecting from the wall at the head of each slab are holy-water fonts converted in this instance into flower receptacles. The font at the head of Mr. Belmont's vault is filled every other day with fresh orchids—his favorite flower.

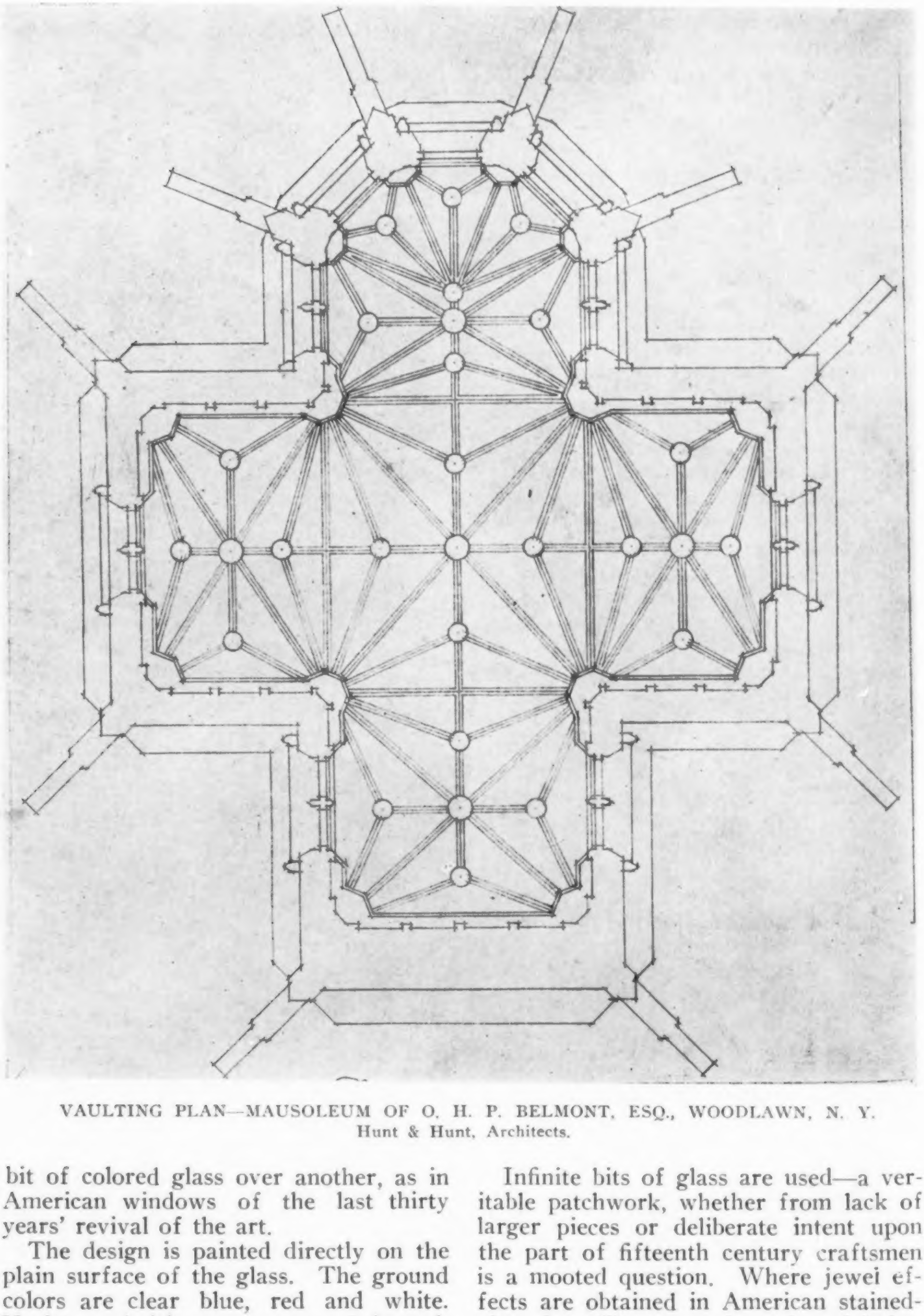
The chapel's sixteen windows are subservient to the architecture and purely decorative in design after the manner of fifteenth century stained glass. Unlike most church windows, they are literally the work of one artist, as was the case in the great storied window of the Lawyers' Club in New York City. As Michael Angelo in the Sistine Chapel eschewed the assistance of fellow artists, painting every inch of his own designs with his own hand, Miss Helen Maitland Armstrong personally selected the subjects, made the cartoons and painted the glass of the sixteen windows.

"Heretofore, in making stained-glass windows with my father," said Miss Armstrong in her studio, "my work has been confined to the painting of faces and figures. The backgrounds, generally landscapes, and all else that goes to the making of a stained-glass window was the work of my father. But these fifteenth century windows are wholly mine."

The subjects of the three chancel windows are the archangels—St. Raphael, St. Gabriel and St. Michael, each with his symbols.

Unlike American stained glass windows which too often aim at realism, the reproduction of nature in line and color, these fifteenth century windows are purely decorative, richly symbolical and perfectly conventional in their treatment. There is no suggestion of modern realism. They are made of clear glass of the same thickness throughout. There is no plating, the laying of one

MEMORIAL WINDOW—MAUSOLEUM OF O. H. P. BELMONT, ESQ., WOODLAWN, N. Y.
Helen Maitland Armstrong.
Hunt & Hunt, Architects.

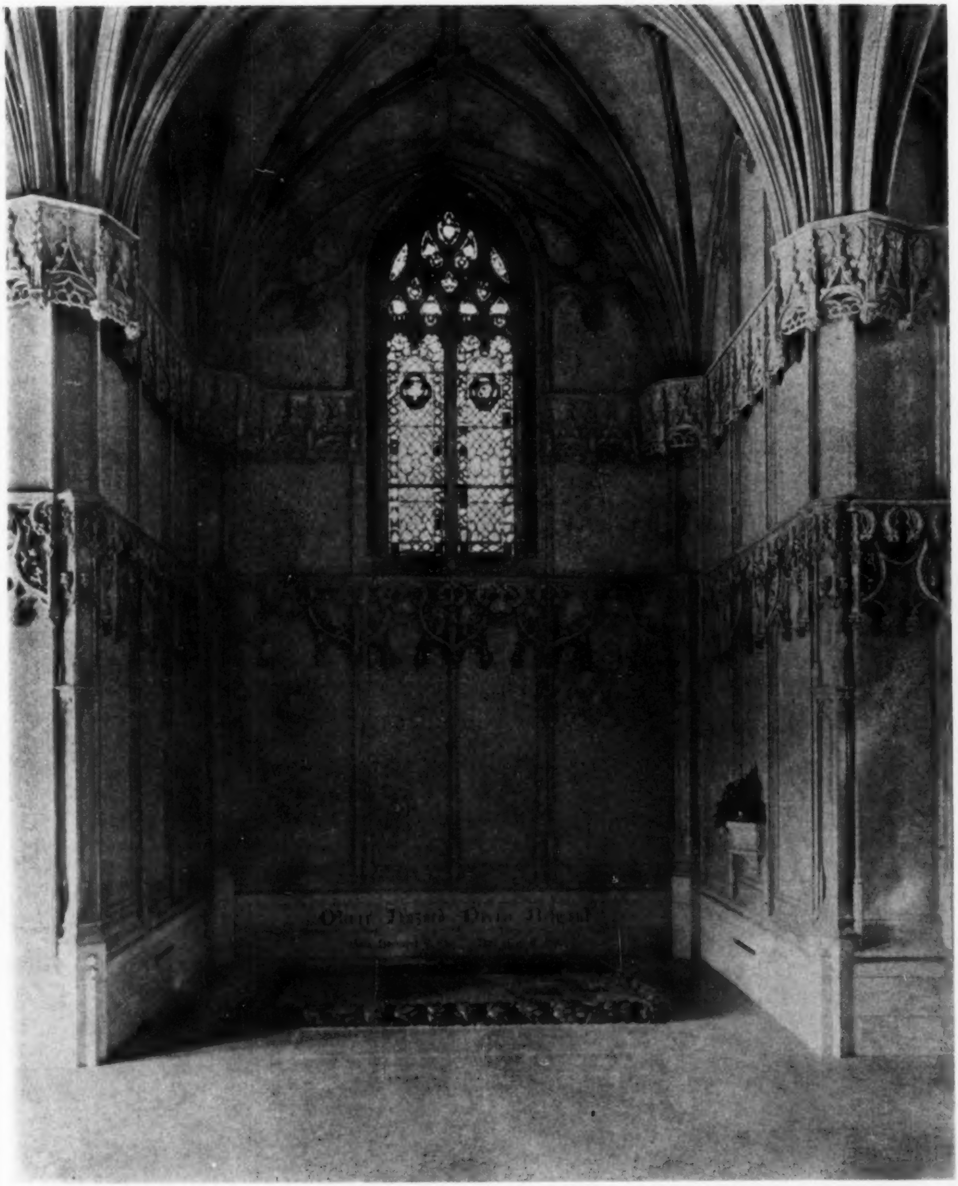


VAULTING PLAN—MAUSOLEUM OF O. H. P. BELMONT, ESQ., WOODLAWN, N. Y.
Hunt & Hunt, Architects.

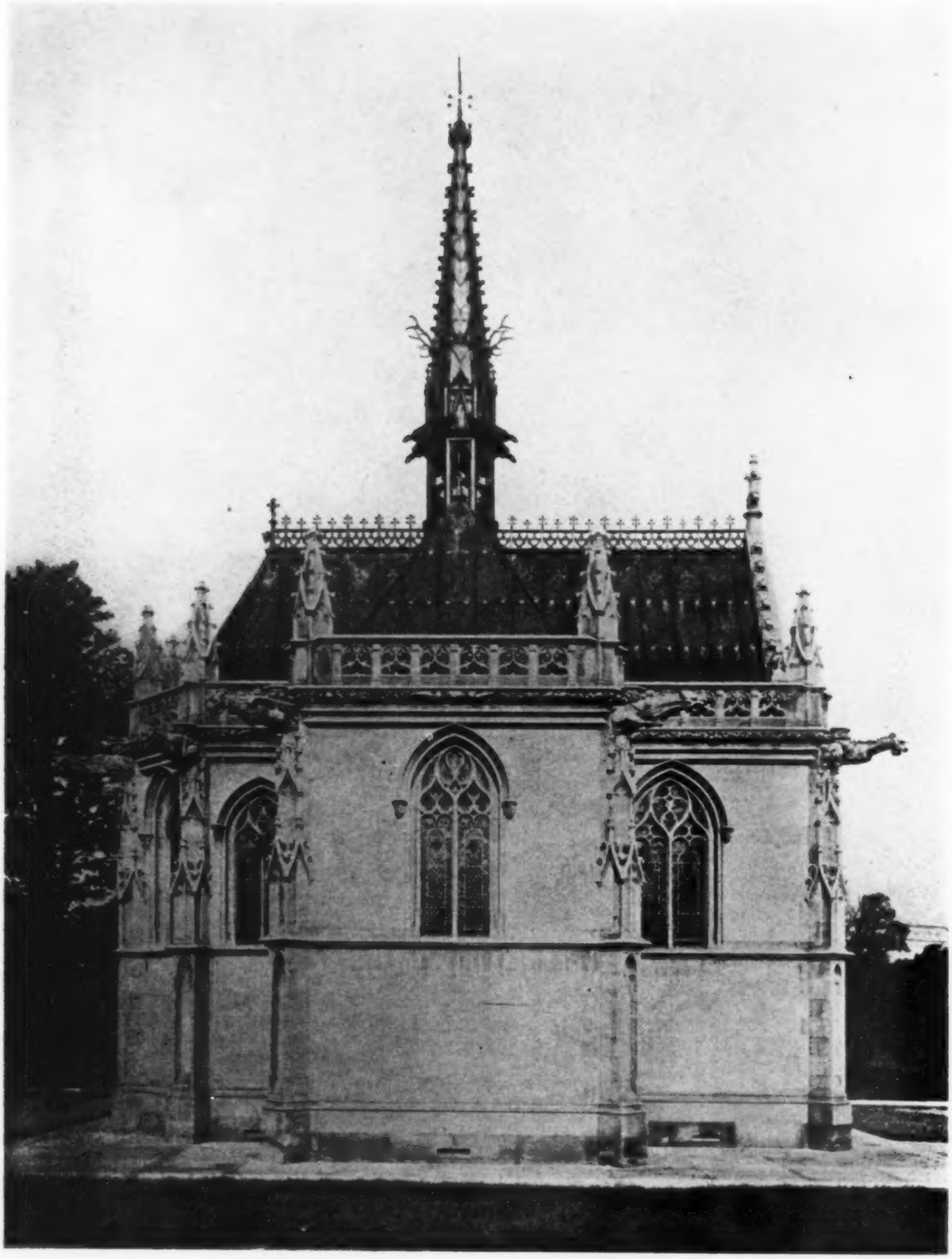
bit of colored glass over another, as in American windows of the last thirty years' revival of the art.

The design is painted directly on the plain surface of the glass. The ground colors are clear blue, red and white. Variety and richness are secured through gold stain and embossing. The shadows are painted in with dark colors.

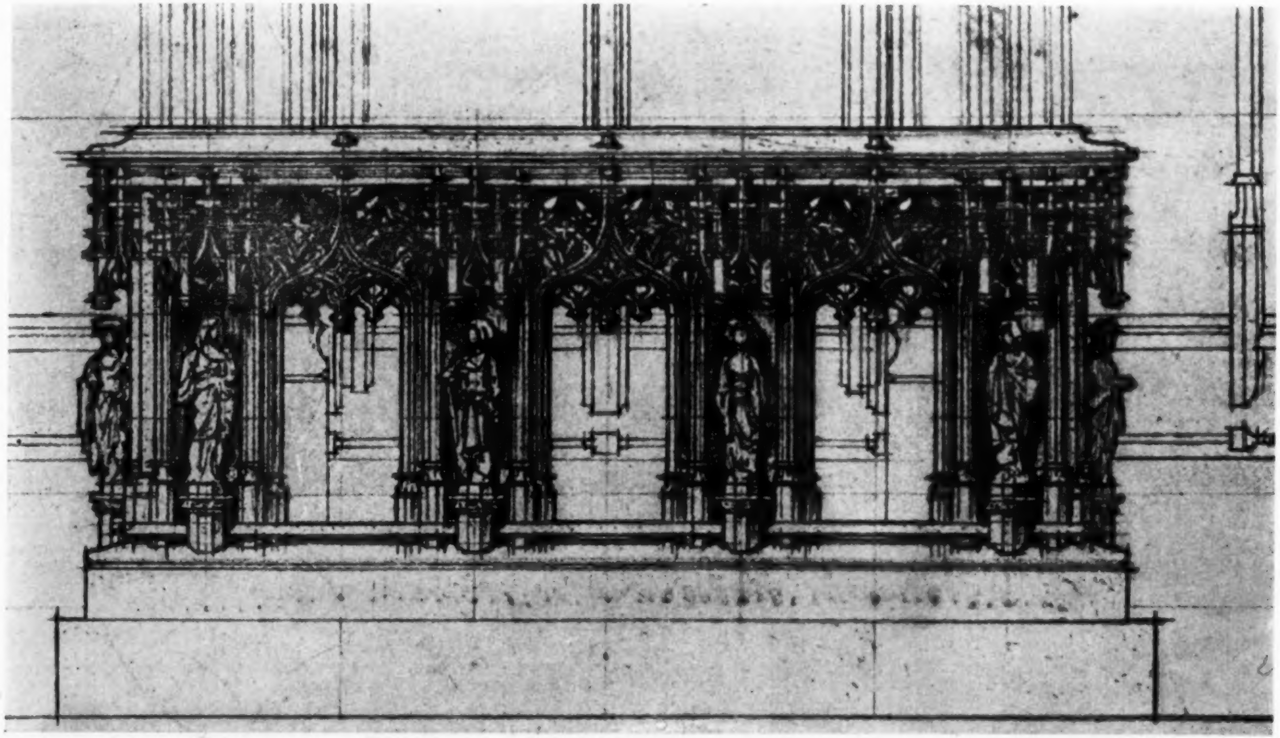
Infinite bits of glass are used—a veritable patchwork, whether from lack of larger pieces or deliberate intent upon the part of fifteenth century craftsmen is a mooted question. Where jewei effects are obtained in American stained-glass by piling up glass in globules, these mediæval windows attain their jewelled richness through embossing.



INTERIOR—MAUSOLEUM OF O. H. P. BELMONT, ESQ., WOODLAWN, N. Y.
HUNT & HUNT, ARCHITECTS.



SIDE ELEVATION—MAUSOLEUM OF O. H. P. BELMONT, ESQ., WOODLAWN, N. Y.
HUNT & HUNT, ARCHITECTS.



Scale—¼-Inch = 1 Foot.

DRAWING FOR THE MARBLE ALTAR-TABLE, MAUSOLEUM OF O. H. P. BELMONT, ESQ., WOODLAWN, N. Y.
HUNT & HUNT, ARCHITECTS.

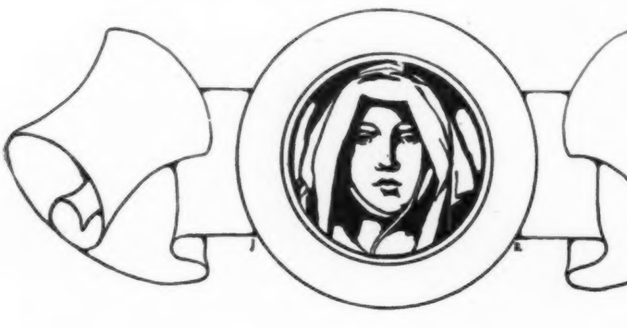
The whole surface of the glass is solidly covered in rich colors. Where in American glass the leading is of uniform thickness and follows the outline of figure, drapery or landscape, these fifteenth century windows reveal leads of varying size, from the scarcely visible wire to the veritable bar. They cross and recross, irrespective of outlines of the design.

There are no figures in the side windows. The backgrounds are solid gray with bright colored borders. Within these borders are emblems. The tracery above all the windows are full of emblems and small symbolical figures with mediæval Latin mottoes from old missals.

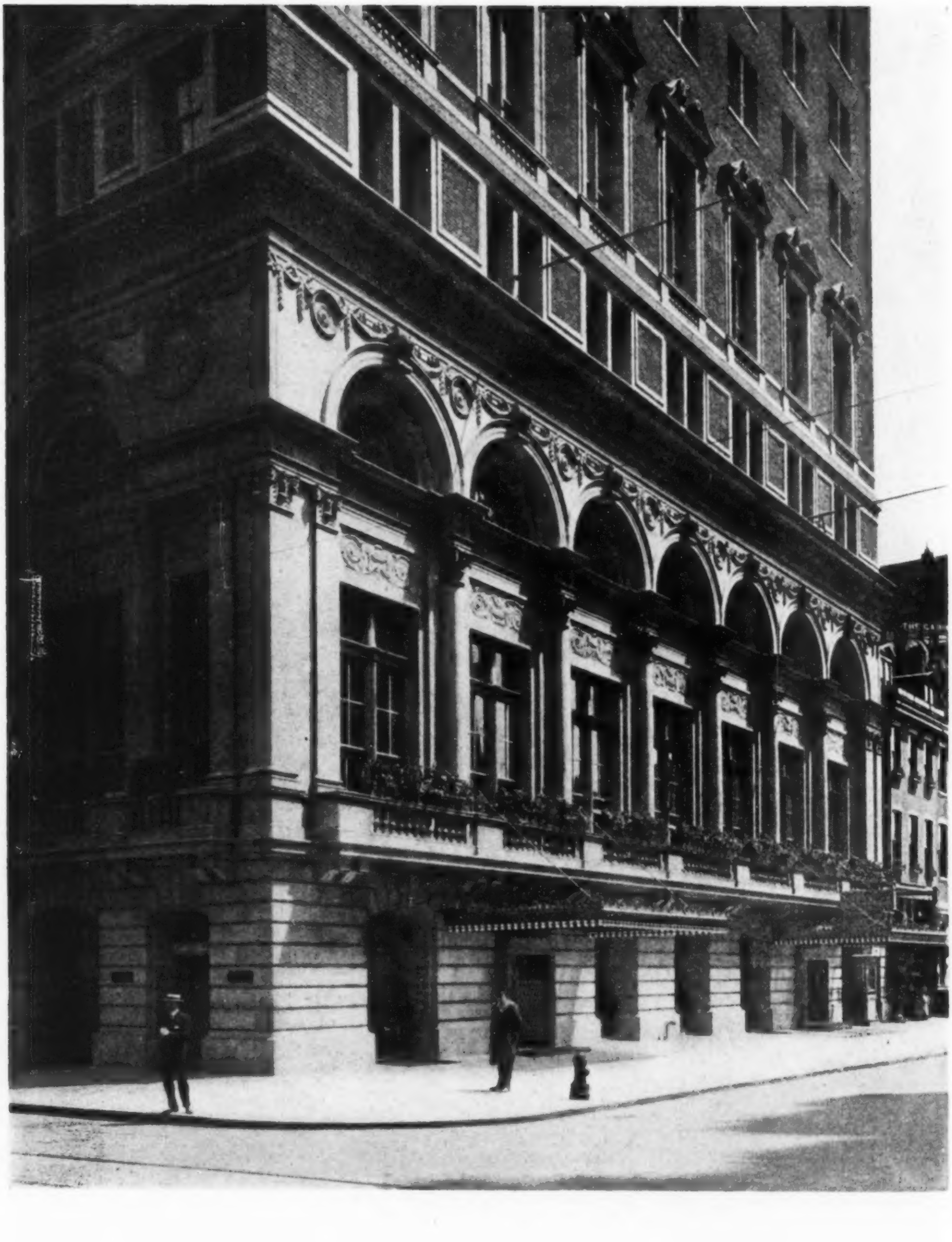
The effect of the whole is a soothing mellow richness. Following the original plan of the architects, when the windows were in place, Mr. William Mackay was commissioned to convert the whole interior into its present archaic charm. How this miracle was wrought through Mr. Mackay's ingenious and original craftsmanship is explained in detail elsewhere. Time has literally been outwitted here, so complete has been the transformation—to eye and touch—of this twentieth century cement interior into a smoke-incensed, weather-stained, age-worn house of prayer.

Aside from the optical illusion, it promises the endurance of the limestone exterior. As the old Italian fresco painters were wont to go over leaf and flower, every detail of design, deepening a color here, lightening a shadow there, Mr. Mackay, with like sympathetic care and intelligence, has applied his aging process to every inch of wall and plastic decoration, subduing, mellowing, obliterating, simulating rain and weather stain leaks through roof, windows and door, until nowhere is there suggestion of the "newness" of a modern structure, while everywhere is the illusion of the fifteenth century masterpiece.

The first step towards the chapel's furnishing is an old-ivory marble altar table which will shortly be put in place. The table is four feet high and seven feet long. It is supported by twelve saints, elaborately carved out of the solid marble. In keeping with the mediæval Gothic color scheme of the whole interior, each apostle and detail of design will be painted after the style of the gorgeous "polychrome" work which is characteristic of a certain period of Gothic architecture, yet rarely associated with Gothic as a style. After it has been painted the table will be subjected to the aging process mentioned above, before falling for all time under the mellowing light of the fifteenth century windows.




The
Ritz-Carlton
Hotel
Philadelphia
Pa.
By HORACE TRUMBAUER
&
WARREN & WETMORE
ASSOCIATED
ARCHITECTS



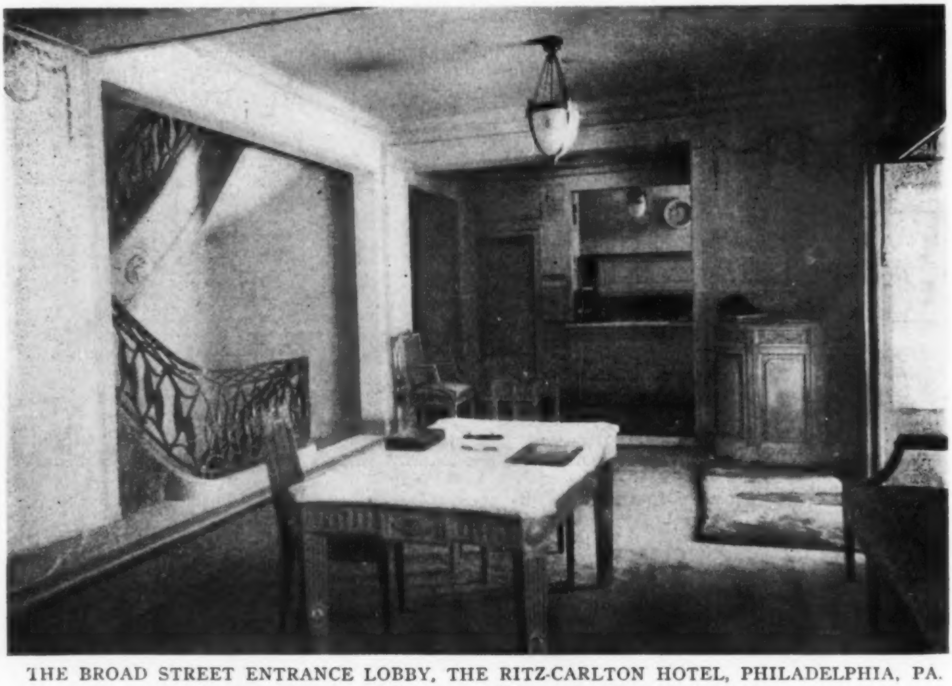
DETAIL OF BROAD STREET FACADE, RITZ-CARLTON HOTEL, PHILADELPHIA, PA.
HORACE TRUMBAUER, AND WARREN & WETMORE, ASSOCIATED ARCHITECTS.

THE RITZ-CARLTON HOTEL, PHILADELPHIA, PA. HORACE TRUMBAUER AND WARREN & WETMORE, ASSOCIATED ARCHITECTS.

ENTRE-SALLE, THE RITZ-CARLTON HOTEL, PHILADELPHIA, PA. HORACE TRUMBAUER AND WARREN & WETMORE, ASSOCIATED ARCHITECTS

ENTRE-SALLE, THE RITZ-CARLTON HOTEL, PHILADELPHIA, PA. HORACE TRUMBAUER AND WARREN & WETMORE, ASSOCIATED ARCHITECTS.

THE MAIN DINING ROOM—THE RITZ-CARLTON HOTEL, PHILADELPHIA.
Horace Trumbauer and Warren & Wetmore, Associated Architects.



THE BROAD STREET ENTRANCE LOBBY, THE RITZ-CARLTON HOTEL, PHILADELPHIA, PA.
Horace Trumbauer and Warren & Wetmore, Associated Architects.

THE BALL-ROOM, THE RITZ-CARLTON HOTEL, PHILADELPHIA, PA.
HORACE TRUMBAUER, AND WARREN & WETMORE, ASSOCIATED ARCHITECTS.

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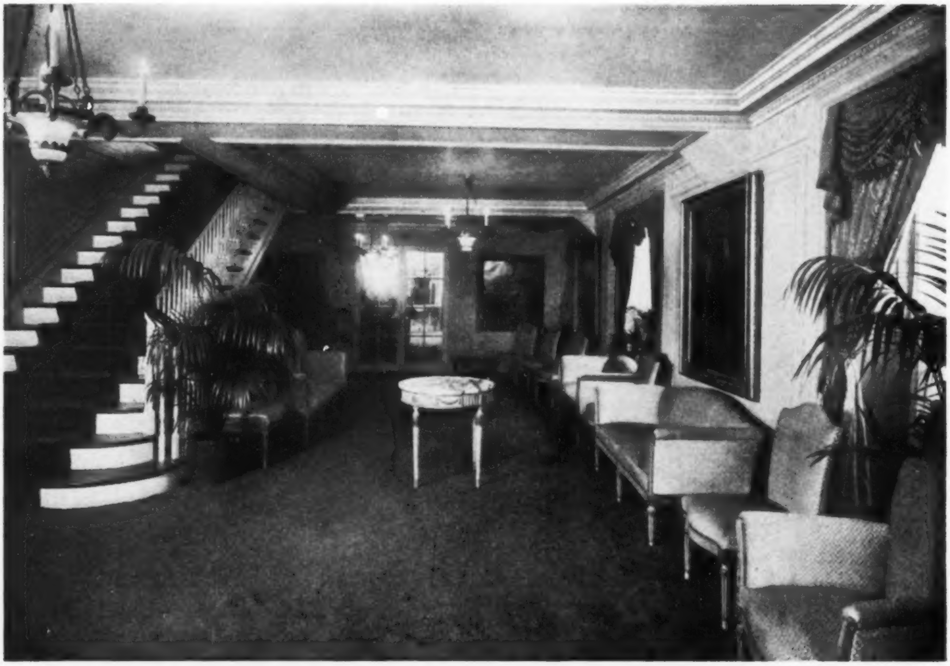
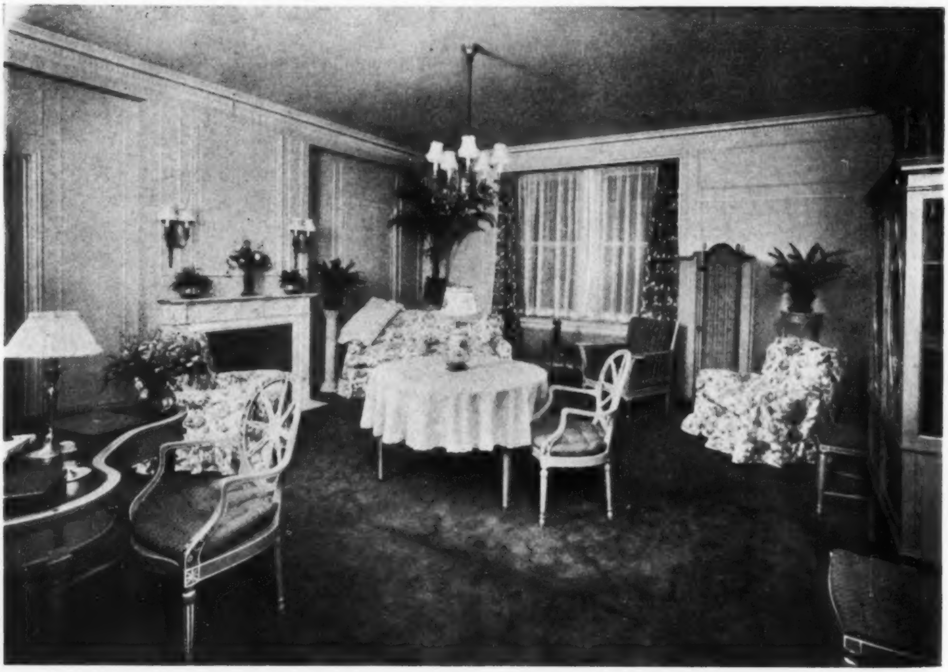
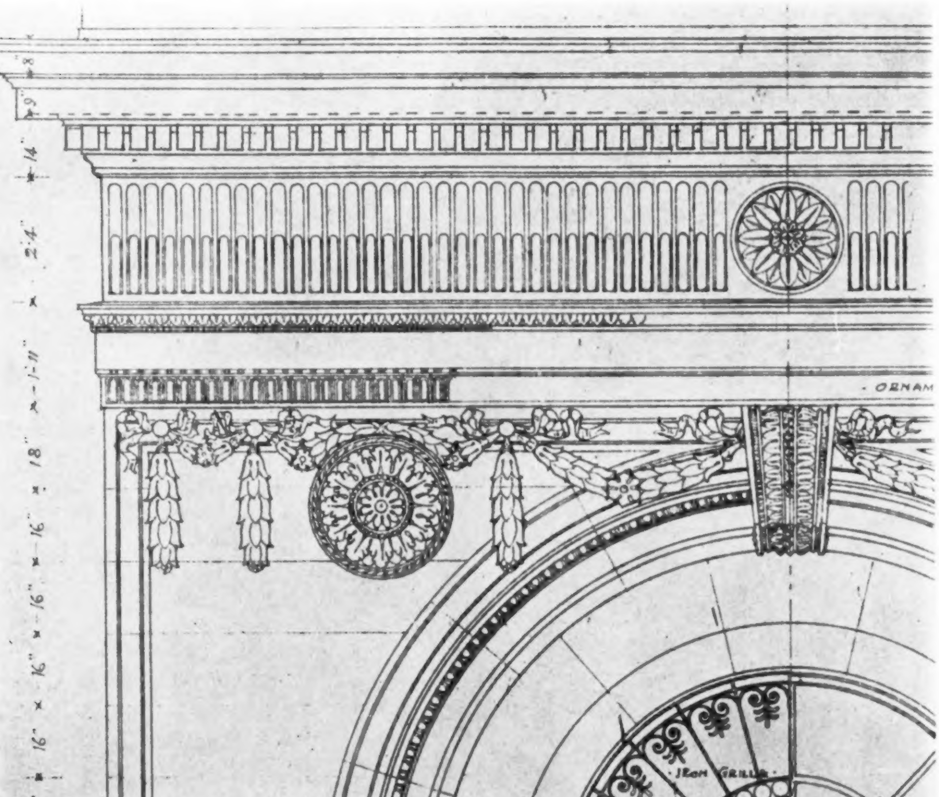


A LOBBY IN THE RITZ-CARLTON HOTEL, PHILADELPHIA, PA
Horace Trumbauer, and Warren & Wetmore, Associated Architects.

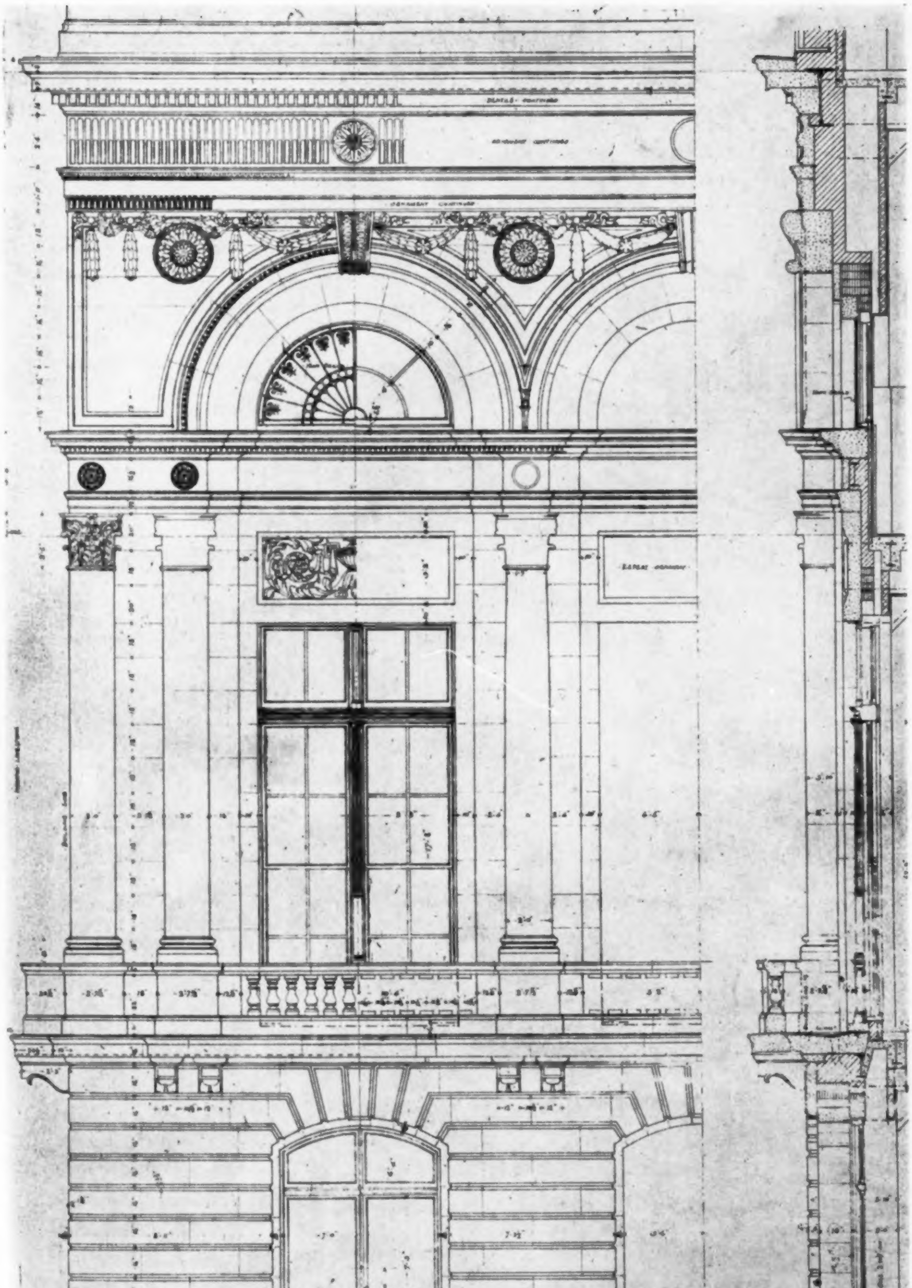


THE PARLOR OF A SUITE, THE RITZ-CARLTON HOTEL, PHILADELPHIA, PA.
Horace Trumbauer, and Warren & Wetmore, Associated Architects.

ARCHITECTS' DRAWING FOR THE ENLARGEMENT OF THE RITZ-CARLTON HOTEL, PHILADELPHIA, PA., HORACE TRUMBAUER AND WARREN & WETMORE, ASSOCIATED ARCHITECTS.

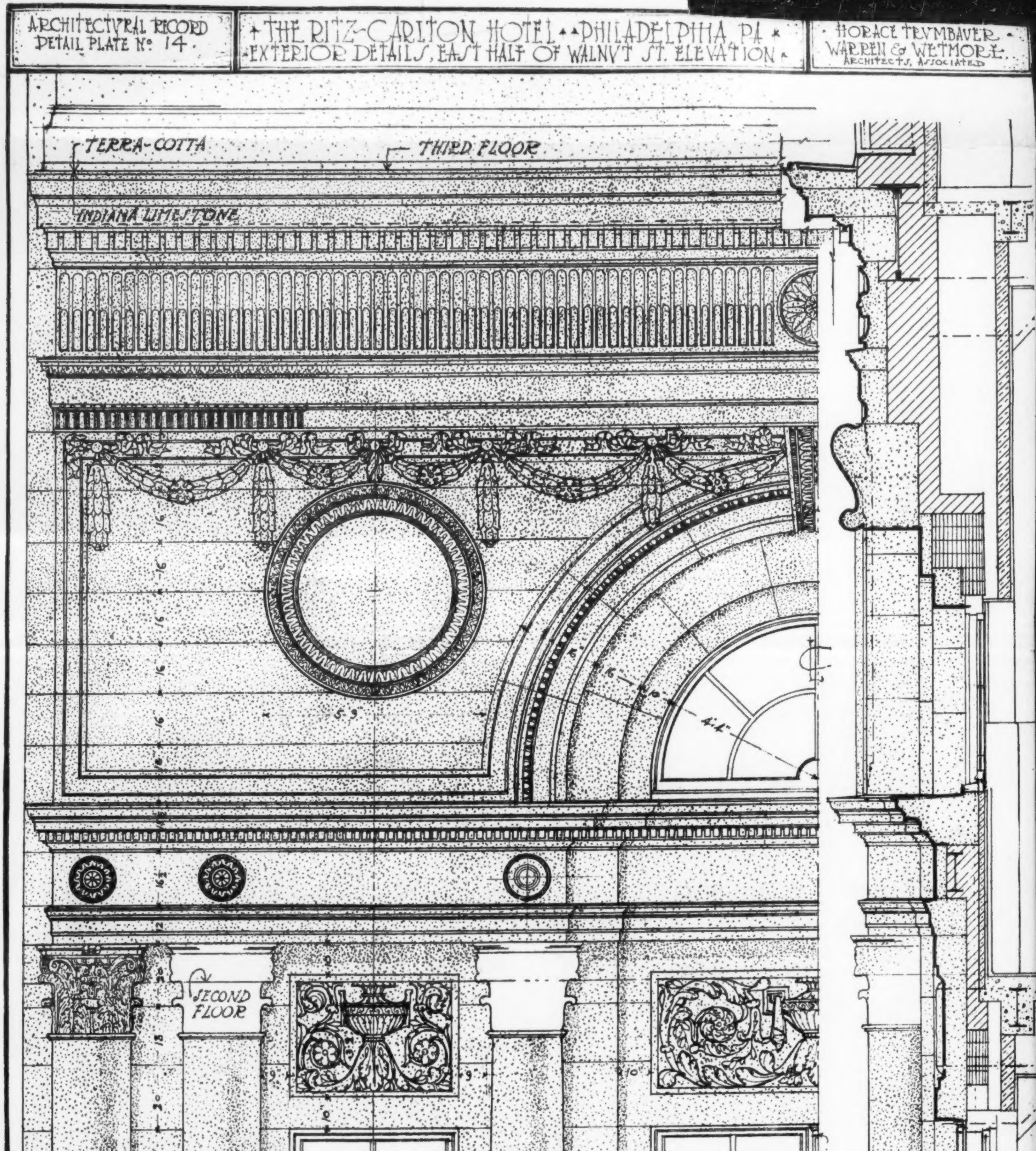


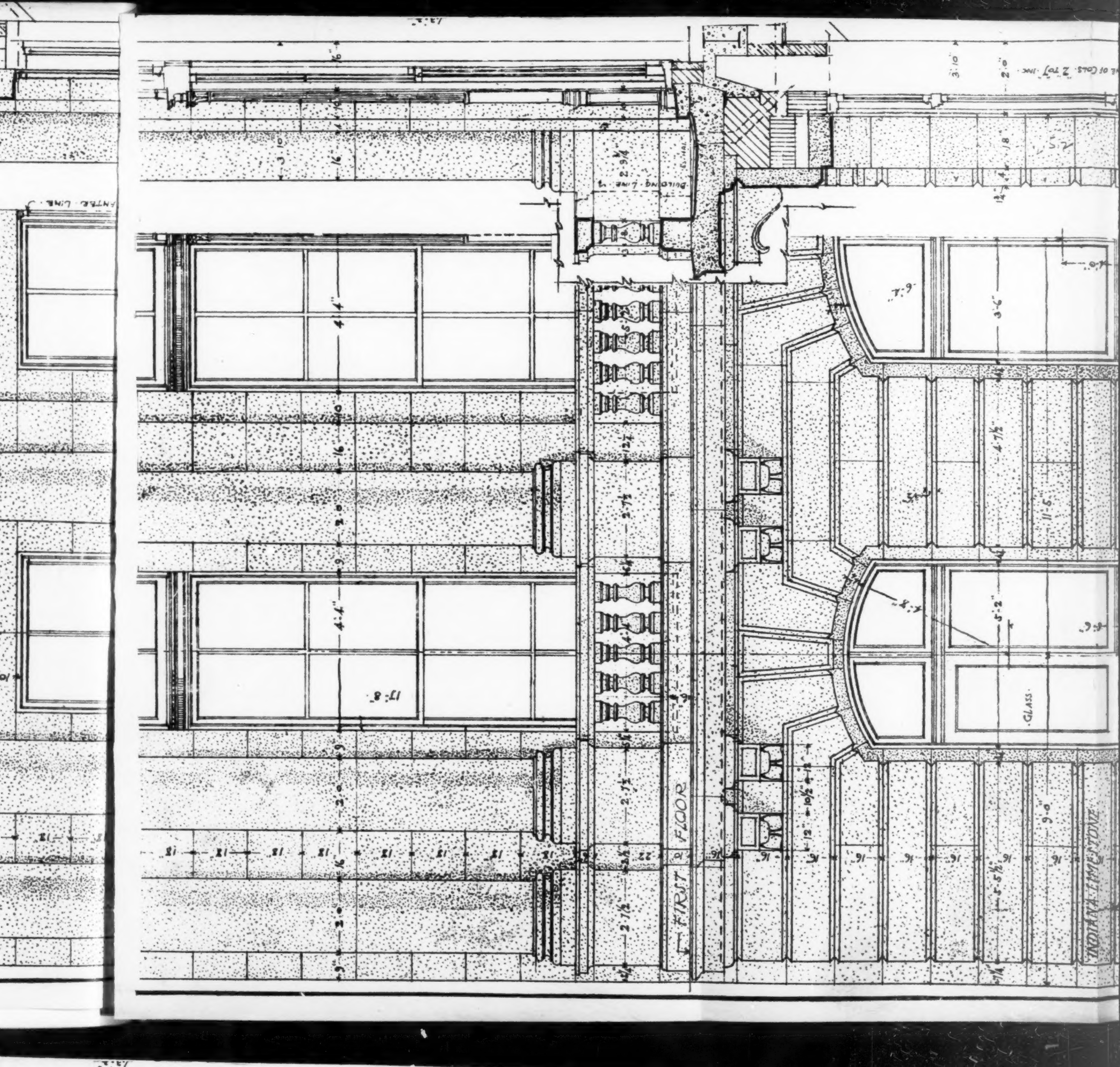
DETAIL, BROAD STREET ELEVATION, THE RITZ-CARLTON HOTEL, PHILADELPHIA, PA.
HORACE TRUMBAUER AND WARREN & WETMORE, ASSOCIATED ARCHITECTS

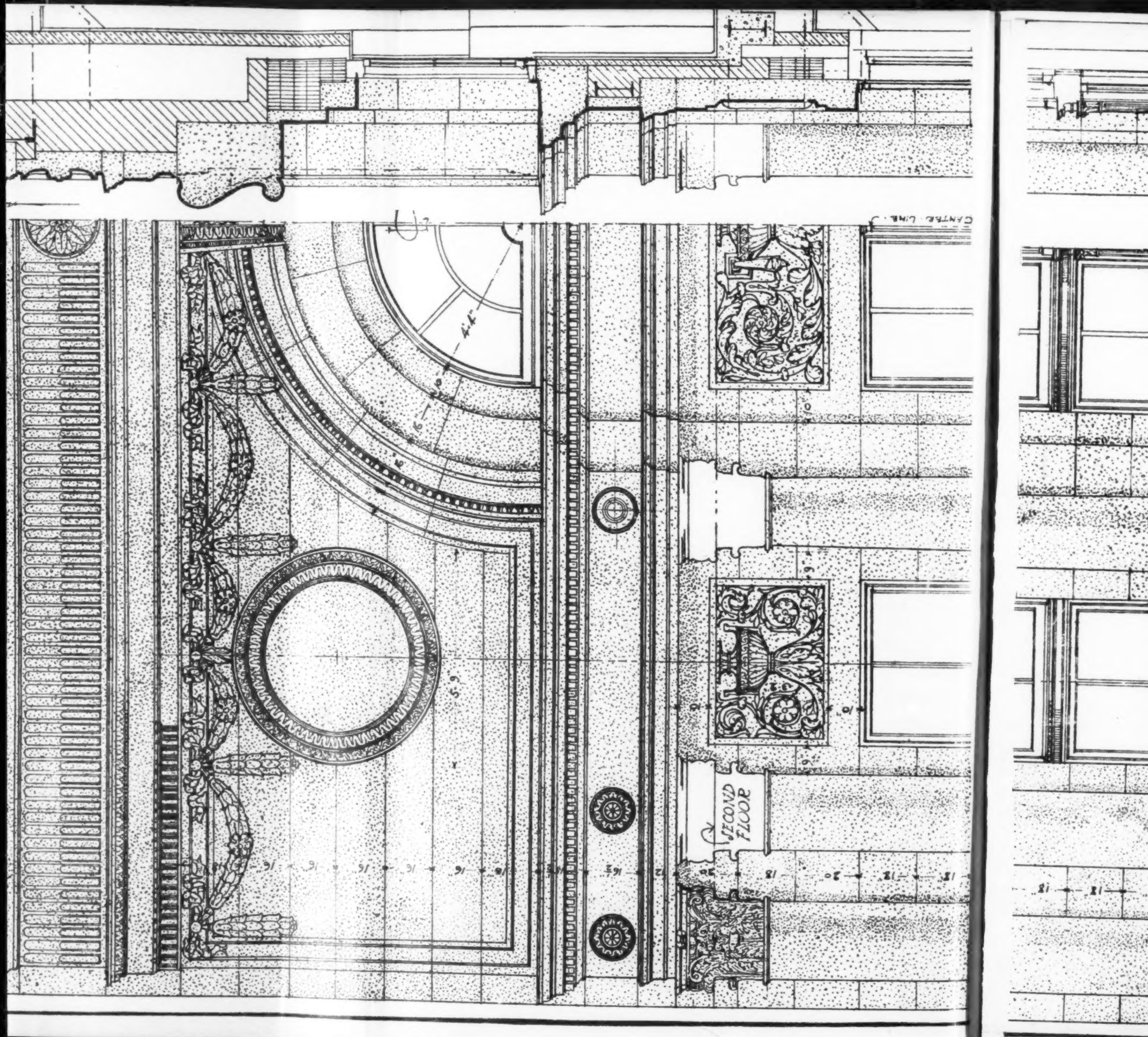


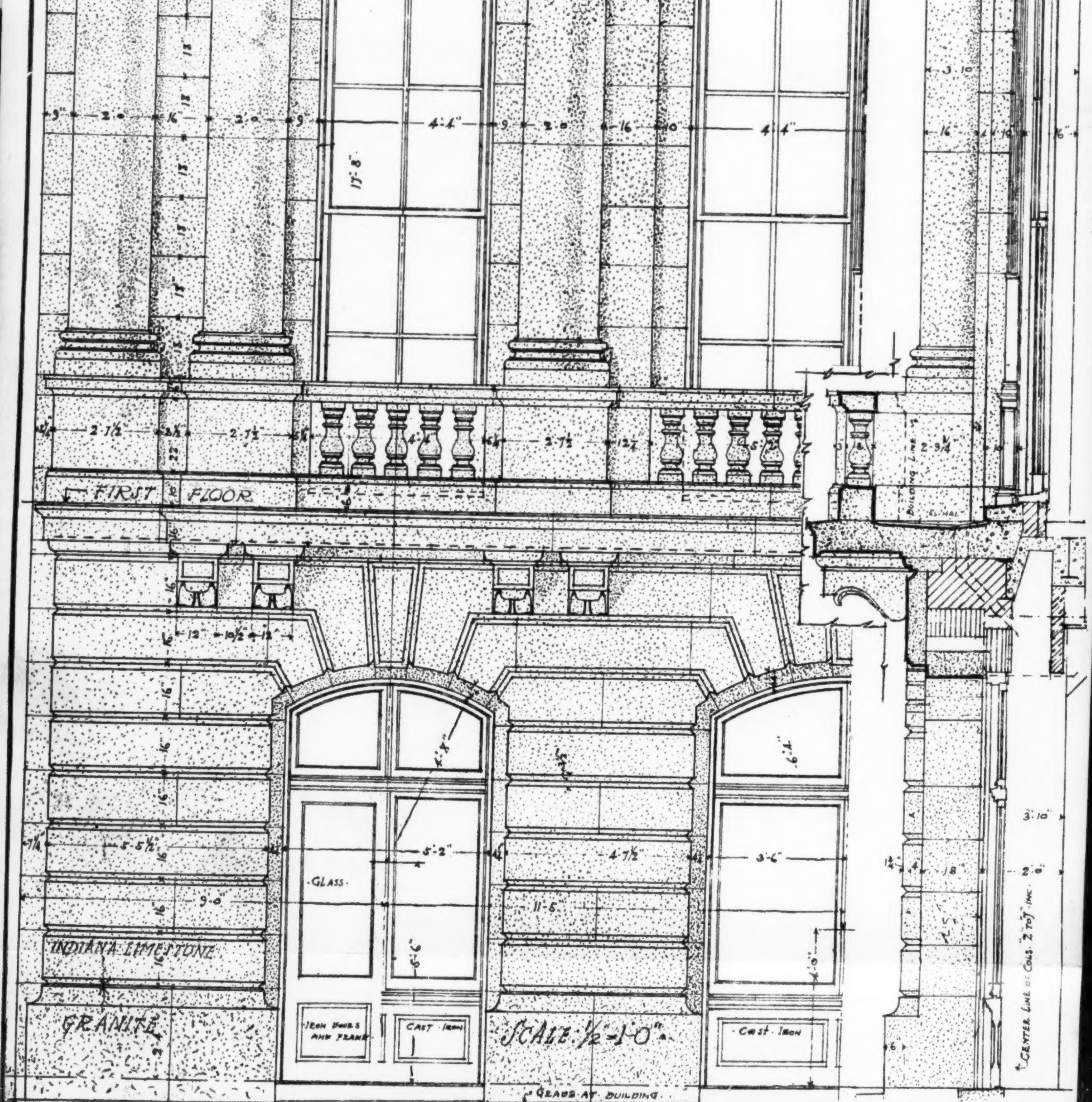
DETAIL DRAWING—FIRST TO THIRD FLOORS (ONE HALF AND SECTION OF THE BROAD ST. ELEVATION), THE RITZ-CARLTON HOTEL, PHILADELPHIA, PA.
HORACE TRUMBAUER AND WARREN & WETMORE, ASSOCIATED ARCHITECTS.

DETAIL ON WALNUT STREET, THE RITZ-CARLTON HOTEL, PHILADELPHIA, PA. HORACE TRUMBAUER AND WARREN & WETMORE, ASSOCIATED ARCHITECTS.


ARCHITECTURAL RECORD
DETAIL PLATE No 14.
THE RITZ-CARLTON HOTEL PHILADELPHIA, PA
EXTERIOR DETAILS, EAST HALF OF WALNUT ST. ELEVATION
HORACE TRUMBAUER
WARREN & WETMORE
ARCHITECTS, ASSOCIATED
TERRA-COTTA
THIRD FLOOR
INDIANA LIMESTONE
SECOND FLOOR


FIRST FLOOR
INDIANA LIMESTONE
GLASS
BUILDING LINE


SECOND FLOOR



ARCHITECTURAL RECORD DETAIL PLATE No 15

THE RITZ-CARLTON HOTEL, PHILADELPHIA PA.
EXTERIOR DETAILS, EAST HALF OF WALNUT ST. ELEVATION

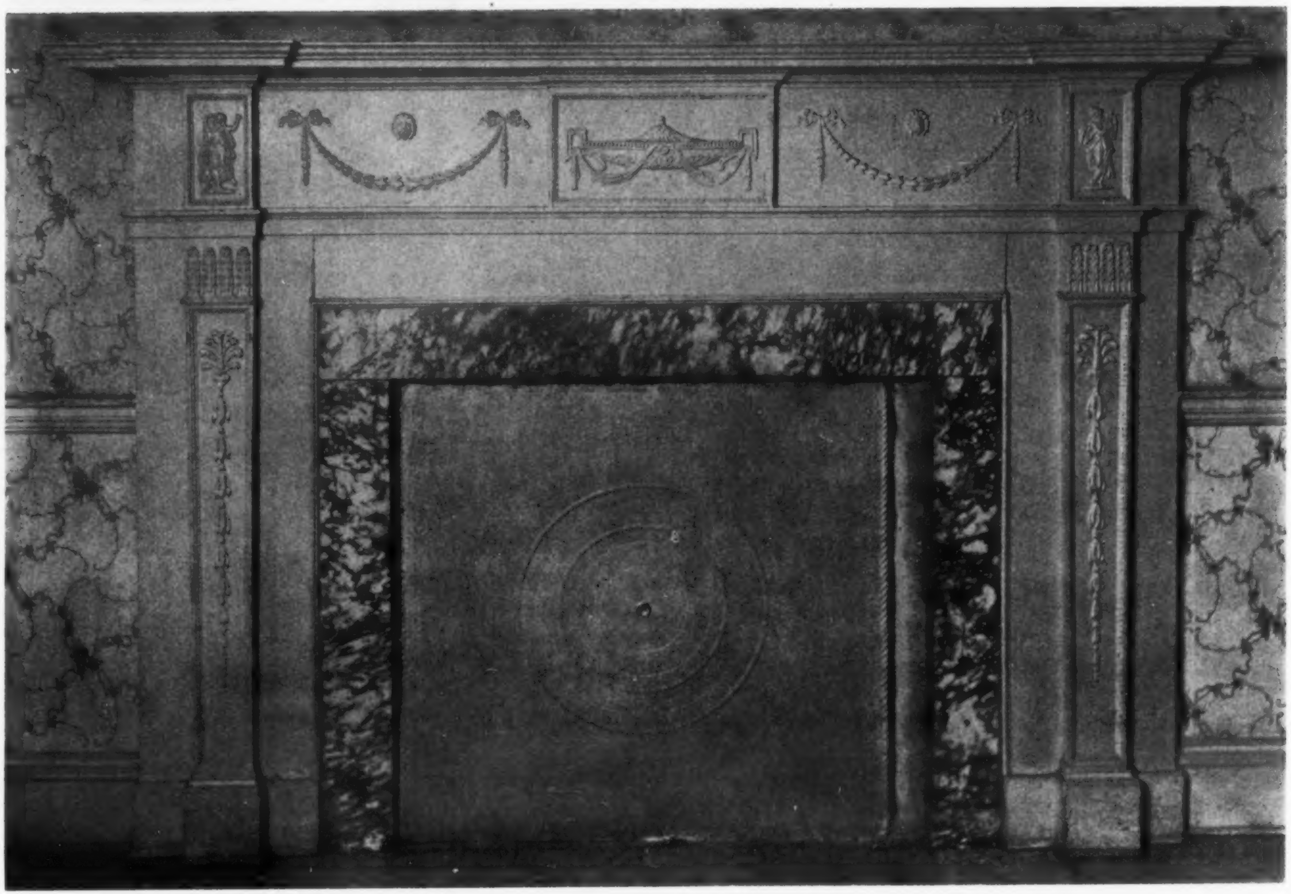
HORACE TRUMBAUER
WARREN & WETMORE
ARCHITECTS, ASSOCIATED

FOUR EARLY AMERICAN MANTELS

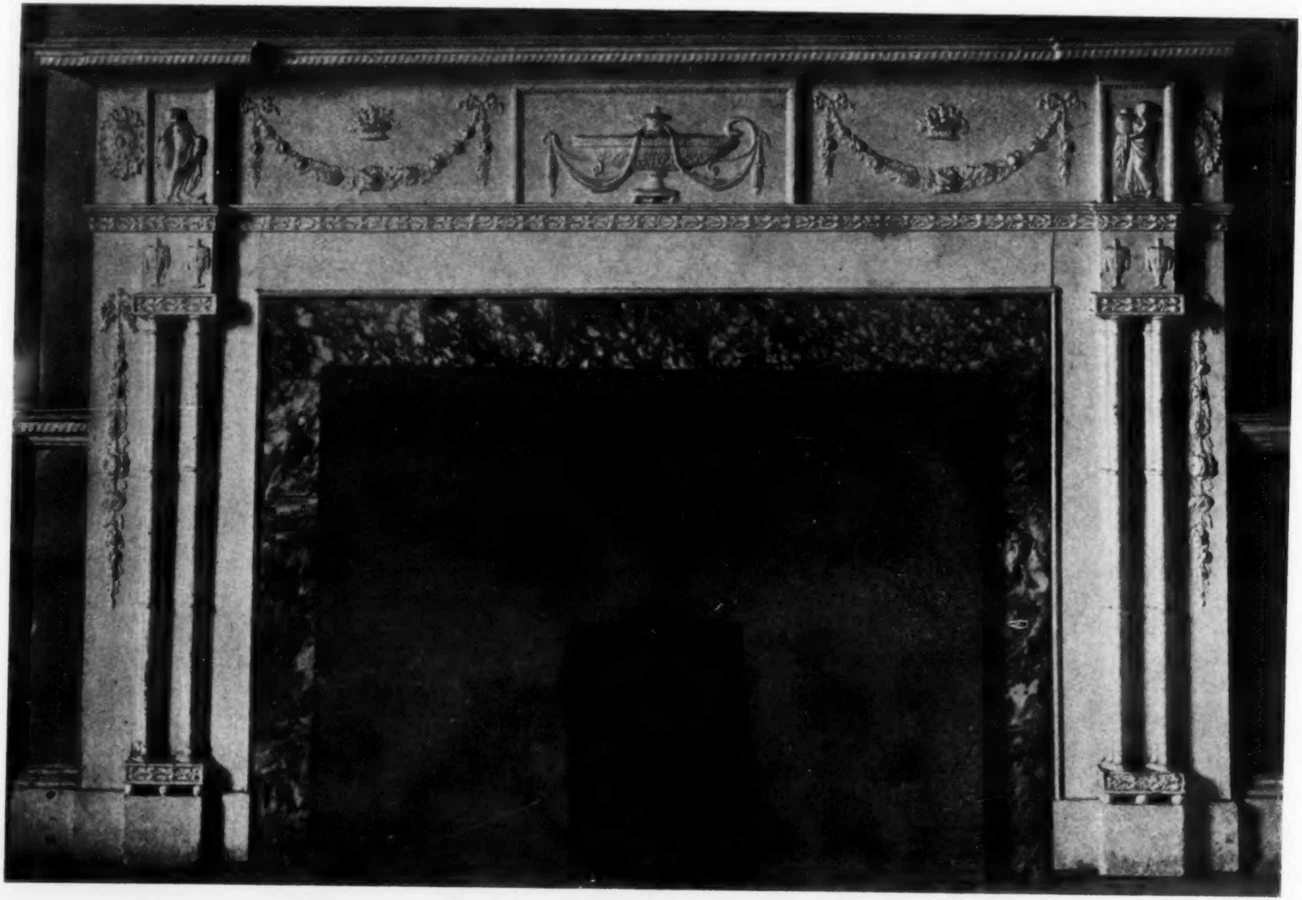
The following illustrations show four unusually interesting and excellent examples of the detail which characterized the last phase of Georgian architecture in this country. It is a type of the style which one discerning and careful critic has called "The Third Type of Georgian Architecture." The type which found for its inspiration a pronounced degree of influence from the work of the Brothers Adam, in England. It was the forerunner of the famous "Classic Revival," and shows a development far more scholarly than the earlier Georgian work—a quality of greater *finesse*, even if of less strength.

The mantels shown are from a residence known as the old Diller house, on South Queen Street, Lancaster, Pa., and though no historic data regarding the building are at hand, it is known to be considerably over a century old. The details are interesting for their consistency and their minor diversity in variations on a generally similar motive.

The photographs, by Darmstetter, of Lancaster, Pa., were received from Robert E. Williams, Architect, of Steelton, Pa.



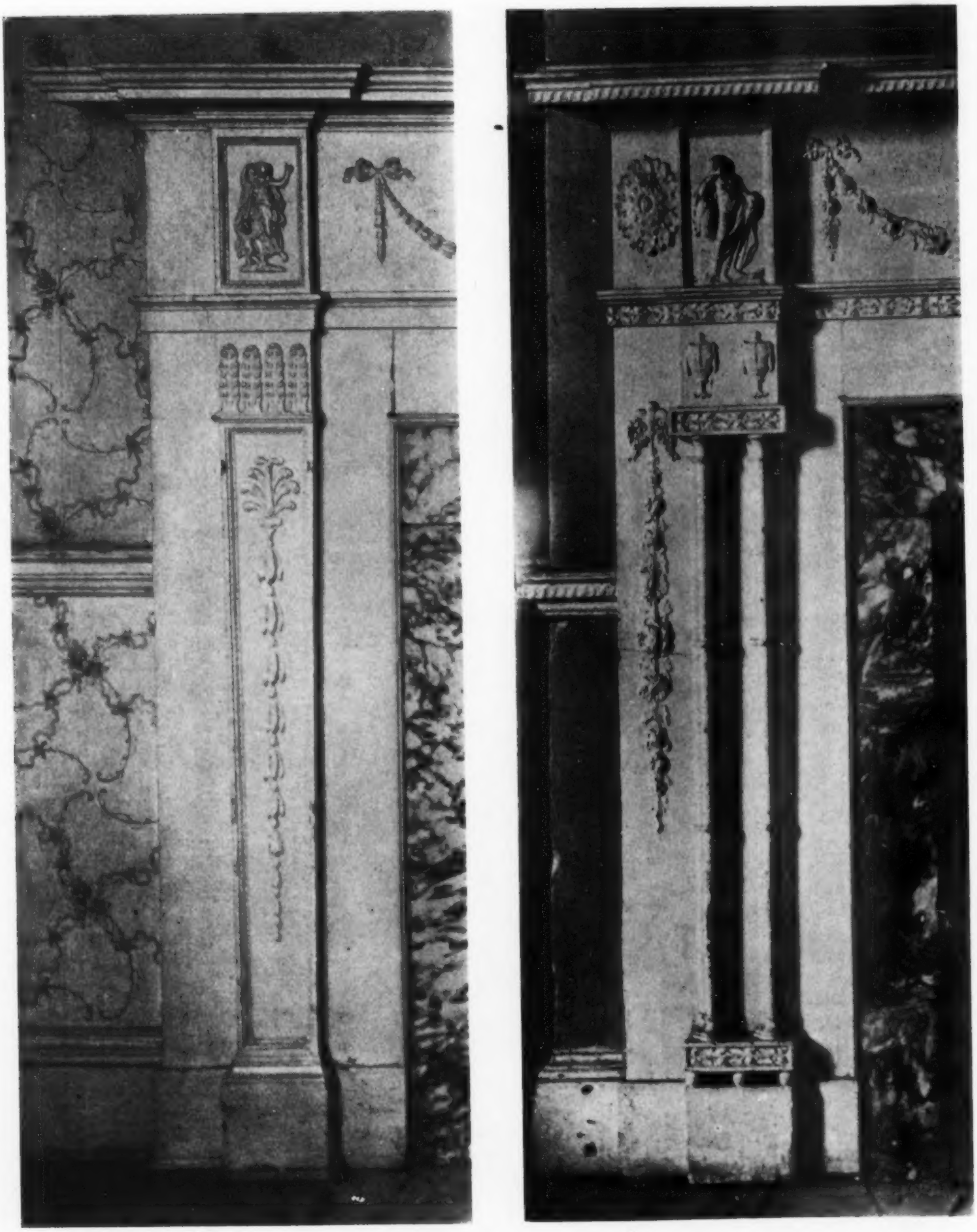
A MANTEL FROM THE DIL-
LER HOUSE, LANCASTER, PA.



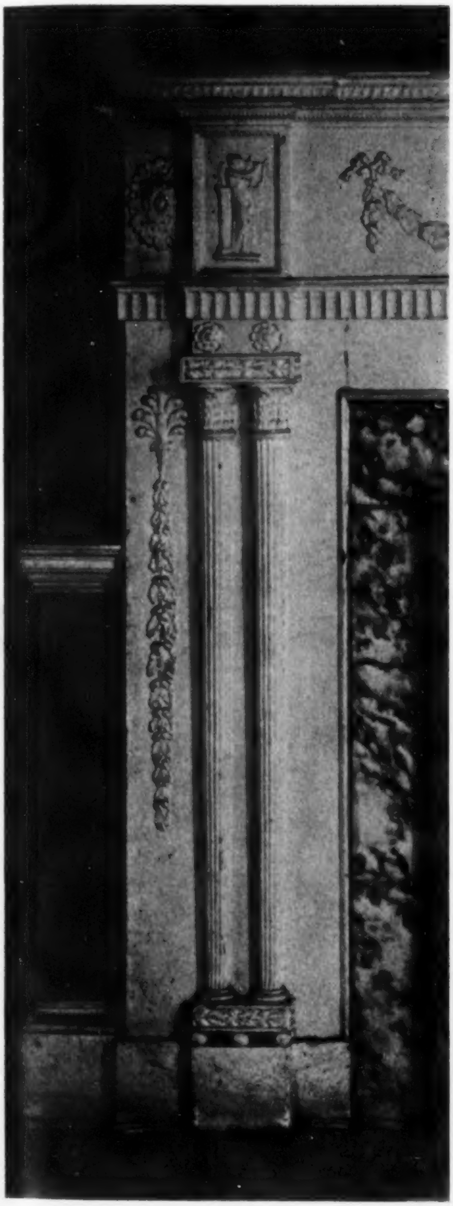
A MANTEL FROM THE DIL-
LER HOUSE, LANCASTER, PA.

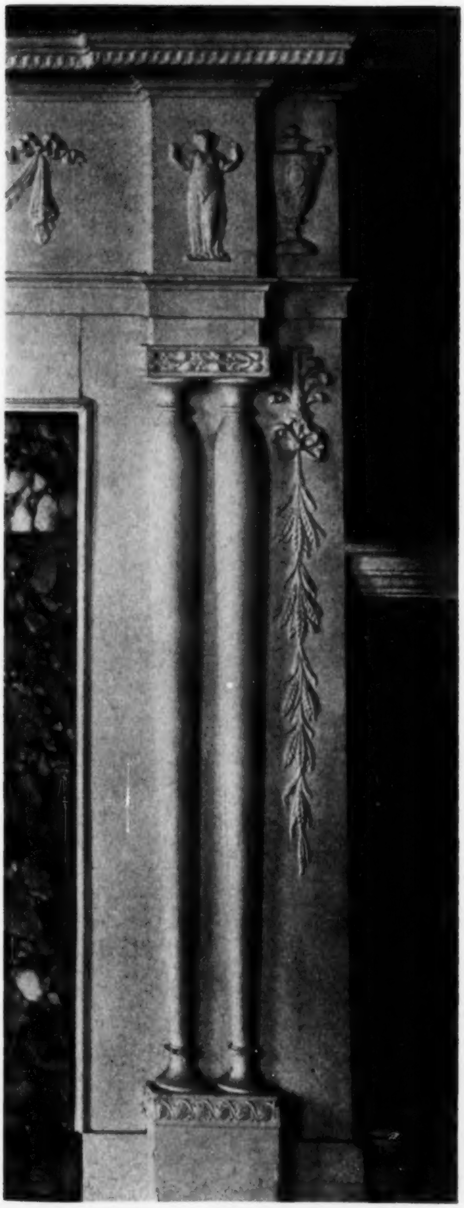
A MANTEL FROM THE DILLER HOUSE, LANCASTER, PA.

A MANTEL FROM THE DILLER HOUSE, LANCASTER, PA.



DETAILS OF MANTELS FROM THE
DILLER HOUSE, LANCASTER, PA.
(See Pages 226 and 227.)





DETAILS OF MANTELS FROM THE DILLER HOUSE, LANCASTER, PA.
(See Pages 228 and 229.)

"STYLE IN AMERICAN ARCHITECTURE"*

AN ADDRESS—BY RALPH ADAMS CRAM.

THE various followings in architecture to-day are so many and so manifest that he who runs may read, and, parenthetically, he who reads very certainly often runs—from some of the strange aberrations that beset his path. I am minded therefore, in writing under the above title, to say less about style and styles and half a style, than of the impulse—or the impulses, for they are legion—behind them, and of the goal to which in devious ways they all are tending.

There is nothing accidental in our stylistic development, or in the universe, for that matter. There was once a very wise man who, on speaking of a miracle to a friend, and being confronted by the assertion that the event was not that but rather a coincidence, devoutly said that he thanked God he was not so superstitious as to believe in coincidences. So, chaotic and illogical as our devious wanderings after the strange gods of style may be, there are grounds for thinking that even here we may find evidences of design, of a Providence that overrules all things for good; "an idea," as Chesterton would say, "not without humor."

For chaos is the only word that one can justly apply to the quaint and inconsequent conceits in which we have indulged since that monumental moment in the early nineteenth century when, architecturally, all that had been since the beginning ceased, and that which had never been before on land or sea began. A walk up Fifth Avenue from Madison Square to the Park, with one's eyes open, is an experience of some surprises, and equal illumination; and it leaves an indelible impression of that primal chaos that is certainly without form, if it is not wholly void. Here one may see in a scant two miles (scant, but how replete with experiences!), treasure-trove of all peoples and all generations: Roman temples and Parisian shops; Gothic of sorts (and out of sorts), from the "Carpenter-Gothic" of 1845, through Victorian of that ilk, to the most modern and competent recasting of ancient forms and restored ideals; Venetian palaces, and Louis Seize palaces, and Roman palaces, and more palaces from wherever palaces were ever built; delicate little Georgian ghosts, shrinking in their unpremeditated contact with Babylonian skyscrapers that poise their towering masses of plausible masonry on an unconvincing sub-structure of plate glass. And it is all contemporary—the oldest of it dates back not two generations; while it is all wildly and improbably different.

The experience prompts retrospection, and we turn over the dog-eared leaves of the immediate past. Apparently it was the same, only less so, back to the decade between 1820 and 1830, and there we find a reasonably firm foothold. Here at last, at the beginning of the century, we discover actual unanimity, and with some relief we go back century after century, tracing variations, but discovering no precedent for the chaos we have left. From time to time, even to the first Olympiad, we suddenly find ourselves at some brief period where a fight is manifestly going on, but there were never more than two parts to the contest, and this once passed, we have another four or five centuries of peaceful and unified development. Our own Colonial merges without a shock in English Georgian; this,

*This paper is based upon an address before the Contemporary Club of Philadelphia, reprinted through courtesy of the Yale Review, July, 1913.

through Inigo Jones, in the Renaissance of the Continent. A generation of warfare lands us in Flamboyant Gothic, and so to real Gothic, that stretches back through logical vicissitudes to the twelfth century. Another upheaval, and in a moment we are with the Romanesque that touches Rome itself—and behind lies Hellas. No chaos here; definite and lawful development; infinite variety, infinite personality, and a vitality that demands a more illimitable word than "infinite." What happened, then, in 1825, what is happening now, what is going to happen, and why?

We all know what our own Colonial was like; perhaps we do not fully realize how varied it was as between one section and another, but at least we appreciate its simplicity and directness, its honesty, its native refinement and delicacy, its frequent originality. It isn't the same as English Georgian; sometimes it is distinctly better, and, however humble or colloquial, it is marked always by extreme good taste. If anything, it improved during the almost two centuries of Colonial growth, and when the nineteenth century opened it was still instinct with life. A half-century later where were we? Remember 1850, and all that date connotes of structural dishonesty, stylistic barbarism, and general ugliness! Here is the debatable period, and we may narrow it; for in 1810 and in 1820, good work was still being done, while in 1840, yes, in 1830, the sodden savagery diluted with shameless artifice was widely prevalent. To me, this decade between 1820 and 1830 is one of the great moments in architectural history, for then the last flicker of instinctive art amongst men died away, and a new period came in. Such a thing had never happened before; it is true Rome never matched Greece in perfection of art; the Dark Ages after her fall were dark indeed; the second Dark Ages after the death of Charlemagne were equally black; while the transition from Gothic to Renaissance was not without elements of disappointment; but at none of these transitional moments were people absolutely wrong-headed, never was the work of their hands positively disgraceful. Even now we put their poor products in our art museums, where they are not outfaced by the splendid monuments of the great and crescent epochs. In a word, what happened about 1825 was anomalous; it happened for the first time; and for the first time whatever man tried to do in art was not only wrong, it was absolutely and unescapably bad.

I should like to deal with this matter in detail, but the labor would prolong itself unduly. Briefly, what happened was, it seems to me, this. The Renaissance had struck a wrong note—and in several things besides architecture: for the first time man self-confidently set to work to invent and popularize a new and perfectly artificial style. I am not concerned here with the question whether it was a good style or not, the point is that it was done with malice aforethought; it was invented by a cabal of painters, goldsmiths, scenic artists, and literary men, and railroaded through a stunned society that, busied with other matters, took what was offered it, abandoned its old native ways, and later, when time for thought offered, found it was too late to go back. Outside Italy there was at first as little desire for the newfangled mode as there was for the doctrinal Reformation outside Germany. In France and England good taste still reigned supreme, and though the dogmatic iconoclasts took good care that the best of the old work should be destroyed, and that suspicion should be cast on what—from sheer exhaustion—they allowed to remain, though for one reason and another the new Classic style came in, the good taste of the people still remained operative, and while Italy and Germany were mired in Rococo and Baroque, they continued building lovely things that were good in spite of their artificial style, because their people had not yet lost their senses or their taste.

It could not last, however; certain essential elements had been lost out of life during the Renaissance and the Reformation; the Revolution—third act in the great melodrama—was a foregone conclusion; it completed the working out of the foreordained plot, and after it was over and the curtain had been rung down,

whatever had been won, good taste had been lost, and remained only the memory of a thing that had been born with man's civilization and had accompanied it until that time.

Alberti and Palladio and Inigo Jones had dissolved and disappeared in the slim refinements of American Colonial. What followed? For a brief time, and in one or two categories of activity, the spacious and delusive imitations that Jefferson more or less popularized, the style sometimes known as neo-Grec, but more accurately termed—because of its wide use for Protestant meeting-houses in country districts—the Greco-Baptist style. It cannot be mistaken: front porticoes of well-designed, four-foot Classical columns made of seven-eighths inch pine stock neatly nailed together, painted white, and echoing like a drum to the incautious kick of the heel; slab sides covered with clapboards, green blinds to the round-topped windows, and a little bit of a brick chimney sticking up at the stern where once, in happier days, stood the little cote that housed the Sanctus bell.

Then came what is well called "Carpenter-Gothic," marked by the same high indifference to structural integrity, and with even less reliance on precedent for its architectural forms; a perfectly awful farrago of libellous details—pointed arches, clustered columns, buttresses, parapets, pinnacles—and all of the ever-present pine lumber painted gray, and usually sanded as a final refinement of verisimilitude. And with these wonderful monuments, cheek by jowl, Italian villas, very white and much balconied, Swiss chalets, and every other imaginable thing that the immortal Batty Langly, or later the admirable Mr. Downing could invent, with, for evidence of sterling American ingenuity, the "jig-saw-and-batten" refinement of crime. We really could not be expected to stand all this, and when the Centennial finally revealed us as, architecturally speaking, the most savage of nations, we began to look about for means of amendment. We were not strikingly successful, as is evidenced by the so-called "Queen Anne" and "Eastlake" products of the morning after the celebration; but the Ruskinian leaven was working, and a group of men did attempt to produce something that at least had some vestiges of thought behind it. It is generally considered very awful indeed—and so it is, but it was the first sincere and enthusiastic work for generations, and demands a word of recognition. Its vivid ugliness is due to the fact that in the space of seventy-five years the last, faintest flicker of sense of beauty had vanished from the American citizen; its intensity of purpose bears witness to the sincerity of the men who did it, and I for one would give them praise, not blame.

We are approaching—in our review—another era in the development of our architecture: let us gather up the many strands in preparation therefor. Here are the "wild and whirling words" of Hunt, Eidlitz, Furness; here is the grave old Gothic of Upjohn's following, Renwick, Congdon, Haight; admirable, much of it, especially in little country churches; here is the Ruskinian fold, Cummings, Sturgis, Cabot—rather Bostonian you will note; here is the old Classical tradition that had slipped very, very far from the standards of Thornton, Bulfinch, McComb, now flaring luridly in the appalling forms of Mullet's Government buildings and the Philadelphia City Hall. Let us pursue the subject no further; there are others, but let them be nameless; we have enough to indicate a condition of some complexity and a certain lack of conviction, or even racial unity. Then the Event occurred, and its name was H. H. Richardson. The first great genius in American architecture, he rolled like an æsthetic Juggernaut over the prostrate bodies of his peers and the public, and in ten years we *did* have substantial unity. We were like the village fisherman who didn't care what color they painted the old tub, "so as they painted her red"; we didn't care what our architecture was, so long as it was Romanesque. For another ten years we had a love-feast of cavernous arches, quarry-faced ashlar, cyclopean voussoirs, and seaweed decoration; village schools, railway stations, cottages—all, all were of the sacrosanct style of certain rather barba-

rous peoples in the south of France at the close of the Dark Ages.

And in another ten years Richardson was dead, and his style, which had followed the course of empire to the prairies and the alkali lands and the lands beyond the Sierras; and a few years ago I found some of it in Japan! It was splendid, and it was compelling, as its discoverer handled it; but it was alien, artificial, and impossible, equally with the bad things it displaced. But it *did* displace them, and Richardson will be remembered, not as the discoverer of a new style, but as the man who made architecture a living art once more.

Eighteen hundred and ninety, and we start again. Two tendencies are clear and explicit. A new and revivified Classic with McKim as its protagonist, and a new Gothic. The first splits up at once into three lines of development: pure Classic, Beaux Arts, and Colonial, each vital, brilliant, and beautiful in varying degrees. The second was, and remains, more or less one, a taking over of the late Gothic of England and prolonging it into new fields, sometimes into new beauties. So matters run on for another ten years; at the end of that time the pure Classic has won new laurels for its clean and scholarly beauty, the Beaux Arts following has abandoned most of its banality of French bad taste and has become better than the best contemporary work in France, while the neo-Colonial has developed into a living thing of exquisite charm. I feel too near the Gothic development to speak of it without prejudice, but its advance has been no less than that of its Classical rival—or should I say, bedfellow?

And now two new elements enter: steel-frame construction on the one hand, and on the other the Secessionist. The steel frame is the *enfant terrible* of architecture, but like so many of the genius it may grow up to be a serious-minded citizen and a good father. It isn't that now, it is a menace, not only to architecture, but to society; but it is young and it is having its fling. If we can make it realize that it is a new force, not a substitute, we shall do well. When it contents itself in its own sphere, and the municipality says kindly and firmly, "thus far and no further"—the "thus far" being about one hundred and twenty-five feet above street level, as in the very wise town of Boston—then it may be a good servant. Like all good servants it makes the worst possible master; and when it claims as its chiefest virtue that it enables us to reproduce the Baths of Caracalla, vaults and all, at half the price, or build a second Chartres Cathedral with no danger from thrusting arches, and with flying buttresses that may be content beautifully to exist, since they will have no other work to do, then it is time to call a halt.

The Secessionist—one might sometimes call him Post-Impressionist, Cubist even—is the latest element to be introduced, and in some ways he is the most interesting. Unlike his *confrères* in Germany, Spain, and Scandinavia, he shows himself little except in minor domestic work—for at heart we are a conservative race, whatever individuals may be—but here he is stimulating. His habitat seems to be Chicago and the Pacific coast; his governing conviction a strongly developed enmity to archæological forms of any kind. Some of the little houses of the Middle West are striking, quite novel, and inordinately clever; some of the work on the Pacific coast, particularly around Pasadena, is exquisite, no less. Personally, I don't believe it is possible wholly to sever oneself from the past, its forms and expression; and it certainly would be undesirable; on the other hand, the astute archæology of some of our best modern work, whether Classic or Gothic, is stupefying and leads nowhere. Out of the interplay of these two tendencies, much of value may arise.

And there you are: three kinds of Classic, two kinds of Gothic, skeleton-frame, and Secessionist—all are operative to-day, each with its own strong following, each, one admits, consummately clever and improving every day; for there is no architectural retrogression in America, there is steady and startling advance, not only in facility for handling and developing styles, but in that far more important affair, recognition of the fact that styles matter far less than style. From a purely professional standpoint

the most encouraging thing is the breadth of culture, the philosophical insight into the essence of things, the liberality of judgment that mark so many of the architectural profession to-day. Gone are the old days of the "Battle of the Styles"; the swords are beaten into pruning-hooks, and these are being used very efficiently in clearing away the thicket of superstitions and prejudices that for so long choked the struggling flower of sound artistic development. The Goth and the Pagan can now meet safely in street or drawing-room without danger of acute disorder; even the structural engineer and the artist preserve the peace (in public); for all have found out that architecture is much bigger than its forms, that the fundamental laws are the same for all good styles, and that the things that count are structural integrity, good taste, restraint, vision, and significance. No one now would claim with the clangor of trumpets that the day of victory was about to dawn for the Beaux Arts, Gothic, or steel-frame styles, or for any other, for that matter; each is contributing something to the mysterious alembic we are brewing; and all we hope is that out of it may come the philosopher's stone that, touching inert matter, shall turn it into refined gold—which by the way is the proper function of architecture and of all the arts.

Chaos then confronts us, in that there is no single architectural following, but legion; and in that fact lies the honor of our art, for neither is society one, or ever at one with itself. This is one of those great five-hundred year periods of boiling activity, one of those nodes that periodically divide the vast vibrations of history, when all things are in flux, when all that has been for four centuries is plunging downward in disintegration, while all that shall be for another equal period is surging upward towards its culmination. Architecture is nothing unless it is intimately expressive, and if utterly different things clamor for voicing, different also must be their architectural manifestation. You can't build a Roman Catholic or Episcopal church in the Beaux Arts vernacular (it has been done, but it is extremely silly) because the Church is the eternal and fundamentally immutable thing in a world of change and novelty and experiment; and it has to express this quality through the connotation of the forms it developed through a thousand years to voice the fullness of its genius that was developing simultaneously. Neither can you use the steel-frame or reinforced concrete to the same ends, though this very sordid wickedness has also been perpetrated, I have grounds for believing. On the other hand, think of using the consummate art of Chartres Cathedral for a railway terminal, or the Sainte Chapelle for a stock exchange, or Haddon Hall for an Atlantic City hotel, or the Ducal Palace in Venice for a department store, or the Erechtheum for a fire-engine house. The case has merely to be stated to be given leave to withdraw, and with it goes, for the time, the talk we once heard of an "American Style." Styles come from unity of impulse; styles come from a just and universal estimate of comparative values; styles come where there is the all-developing influence and the vivid stimulus of a clear and explicit and compelling religious faith; and these occur, not at the moment of wild confusion when one epoch of five centuries is yielding to another, but after the change in dynasty has been effected, and the new era begins its ascending course. The only premeditated architecture I know, the only style that was deliberately devised and worked out according to preconceived ideas, the style of the Renaissance, was yet not half so artificial as it looks (and as some of us would like to think), for in a sense it was inevitable, granting the postulates of the humanists and the flimsy dogmas of the materialists of the sixteenth century. It did not develop insensibly and instinctively like Hellenic and Byzantine and Gothic and Chinese Buddhist art—the really great arts in history—but once the great parabola of mediæval civilization curved downward to its end, once Constantinople fell, something of the sort was not to be escaped.

Now I do not feel that we shall be content with an art of the scope of that

of the Renaissance; I do not feel that we shall be content with a new epoch of civilization on Renaissance lines. There are better ways of life, and saner. I believe all the wonderful new forces now working hiddenly, or revealing themselves sporadically, will assemble to a new synthesis that will have issue in a great epoch of civilization as unified as ours is disunited, as centripetal as ours is centrifugal, as spiritually efficient as ours is materially efficient; and that then will come, and come naturally and insensibly, the inevitable art that will be glorious and great, because it shows forth a national character, a national life that also is great and glorious.

Reduced to its simplest terms, American architecture is seen to have had two epochs. First, the attempted conservation of a definite style (which, whatever its genesis, had become an essential part of our racial character), and its complete disappearance exactly at the time when the serious and conservative nature of the people of the United States gave place, with almost equal suddenness, to a new quality born partly of political independence, partly of new and stimulating natural conditions, partly of the backwash from Continental revolution, and above all of the swift working out, at last, of powers latent in the Renaissance-Reformation itself. Second, the confused activities of many men of many minds, who had cut loose from tradition become moribund. Communal interests, the sense of solidarity, inherited from the Middle Ages and persisting in strange new forms even through the Renaissance epoch itself, had yielded to a crescent individualism, and architecture, like a good art, followed close to heel.

This is really all there is to our architectural history, and I have used many words in saying what might have been expressed in a sentence. What lies before us? More pigeon-holes, more personal followings, more individualism, with anarchy at the end? I do not think so, but rather exactly the reverse. Architecture is always expressive; sometimes it reveals metaphysical and biological truth, when in itself there is no truth whatever. If we built Independence Hall in Philadelphia, there was something in us of the same nature, and we glory in the fact. If we built the City Hall in the same town, there was something in us like that, arresting as the thought must be. If we are doing three Classics, and two Gothics, and steel-frame, and Post-Impressionism (not to mention the others) at the present moment, then that is because our nature is the same. Now, can we again prove the truth of the saying, "Ex pede Herculem," and, using our present output as the foot (one admits the connotation is of the centipede), create the Hercules? I mean, can we, from what we are doing to-day, predict anything of the future? Not of our future style—that will be what our society makes it; but of society itself. For my own part I think we can; for all that we are doing in architecture indicates the accuracy of the deduction we draw from myriad other manifestations, namely, that we are at the end of an epoch of materialism, rationalism, and intellectualism, and at the beginning of a wonderful new epoch, when once more we shall achieve a just estimate of comparative values, when material achievement becomes the slave again, and no longer the slave driver, when spiritual intuition drives mere intellect back into its proper and very circumscribed sphere, and when religion, at the same time dogmatic, sacramental, and mystic, becomes, in the ancient and sounding phrase, "One, Holy, Catholic, and Apostolic," and assumes again its rightful place as the supreme element in life and action, the golden chain on which are strung, and by which are bound together, the varied jewels of action.

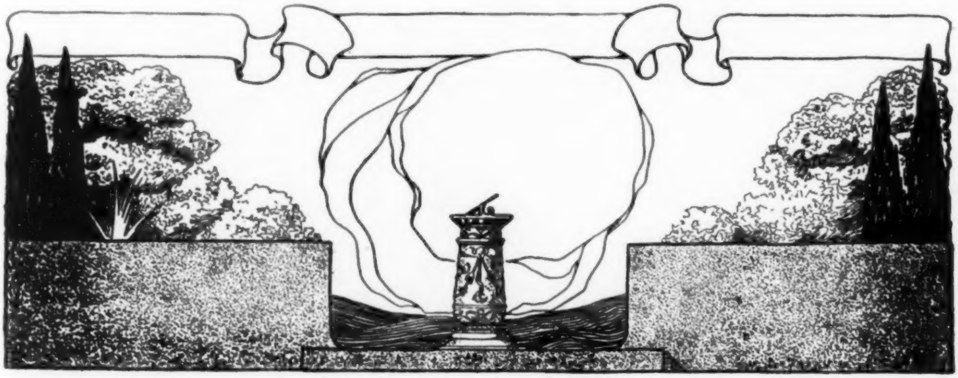
Everywhere, and at the very moment when our material activity and our material triumphs seem to threaten the high stars, appear the evidences that this wonderful thing is coming to pass, and architecture adds its modicum of proof. What else does it mean that on every hand men now demand in art better things than ever before, and get them, from an increasing number of men, whether they are Pagans, Goths, or Van-

dals? What is the meaning of the return to Gothic, not only in form, but "in spirit and in truth"? Is it that we are pleased with these forms and wearied of others? Not at all. It is simply this, that the Renaissance-Reformation-Revolution having run its course, and its epoch having reached its appointed term, we go back, deliberately or instinctively, as life goes back, as history goes back, to restore something of the antecedent epoch, to win back something we have lost, to return to the fork in the roads, to gain again the old lamps we credulously bartered for new. Men laugh—or did, they have given it over of late—at what they call the reactionary nature and the affectation of the Gothic restoration of the moment, and they would be right if it meant what they think it means. Its significance is higher than their estimate, higher than the conscious impulses of those who are furthering the work; for back of it all lies the fact that what we need to-day in our society, in the State, in the Church, is precisely what we abandoned when, as one man, we arose to the cry of the leaders and abettors of the Renaissance. We lost much, but we gained much; now the time has come for us to conserve all that we gained of good, slough off the rest, and then gather up again the priceless heritage of mediævalism, so long disregarded to our pain and loss.

Shall we rest there? Shall we restore a style, and a way of life, and a mode of thought? Shall we re-create an amorphous mediævalism and live listlessly in that fool's paradise? On the contrary. When a man finds himself confronting a narrow stream, with no bridge in sight, does he leap convulsively on the very brink and then project himself into space? If he does he is very apt to fail of his immediate object—which is to get across. No; he retraces his steps, gains his running start, and clears the obstacle at a bound. This is what we architects are doing when we fall back on the great past for our inspiration; this is what, specifically, the Gothicists are particularly doing. We are getting our running start, we are retracing our steps to the great Christian Middle Ages, not that there we may remain, but that we may achieve an adequate point of departure; what follows must take care of itself.

And in following this course we are not alone; we have life with us; for at last life also is going backward, back to gather up the golden apples lost in the wild race for prizes of another sort, back for its running start, that it may clear the crevasse that startlingly has opened before it. Beyond this chasm lies a new field, and a fair field, and it is ours if we will.

The night has darkened, but lightened towards dawn; there is silver on the edges of the hills and promise of a new day, not only for architects, but for every man.



HOUSES ON CRESHEIM VALLEY DRIVE ("QUADRUPLE" TO LEFT), CHESTNUT HILL, PA., DUHRING, OKIE & ZIEGLER, ARCHITECTS

A VIEW OF BENEZET ST., CHESTNUT HILL, PA.
Duhring, Okie & Ziegler, Architects.

ARCHITECTURE AND THE HOUSING PROBLEM

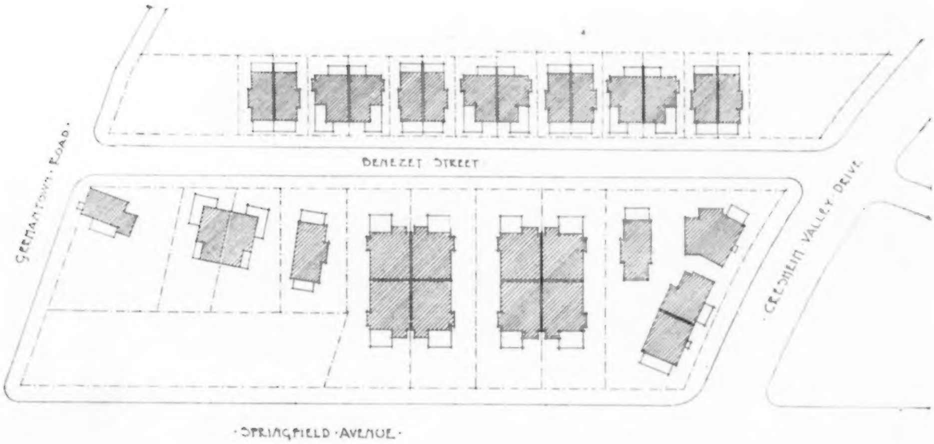
RECENT WORK BY DUHRING OKIE & ZIEGLER

BY C. MATLACK PRICE

IT has long since been demonstrated not only by architects, but even by speculative builders, that "ready-made houses," or houses erected in quantities for the development of a tract of real estate, need not necessarily be entirely devoid of architectural qualities. It must be said, however, that most achievements in this direction are to be summarized in a somewhat negative manner. They were not actually offensive, but fell far short of those qualities of architectural nicety which one had like to have seen.

Such special developments of architecture, however, must undergo certain phases of evolution, and this type—"the ready-made house," by reason of remaining until very recently entirely in the hands of the speculative builder, has not by any means kept pace with other architectural achievements in this country. It would not appear to have occurred to the builder that a group of thoroughly attractive houses (even at the cost of a slightly greater initial investment) might pay a higher and more lasting interest than another group which, if it did not actually repel, could not, by the wildest flight of imagination, be called tempting to the prospective tenant.

In a suburban tract known as Chestnut Hill, however, near Philadelphia, the happy collusion of a far-sighted real-estate owner and a clever and conscientious architectural firm, has resulted in the erection of a group of small houses, detached, semi-detached, and "quadruple," presenting not only a thoroughly pleasing and alluring architectural aspect in



A BLOCK PLAN SHOWING THE DISPOSITION OF THE QUADRUPLE, "TWIN" AND SINGLE HOUSES, CHESTNUT HILL, PA.
Duhring, Okie & Ziegler, Architects.

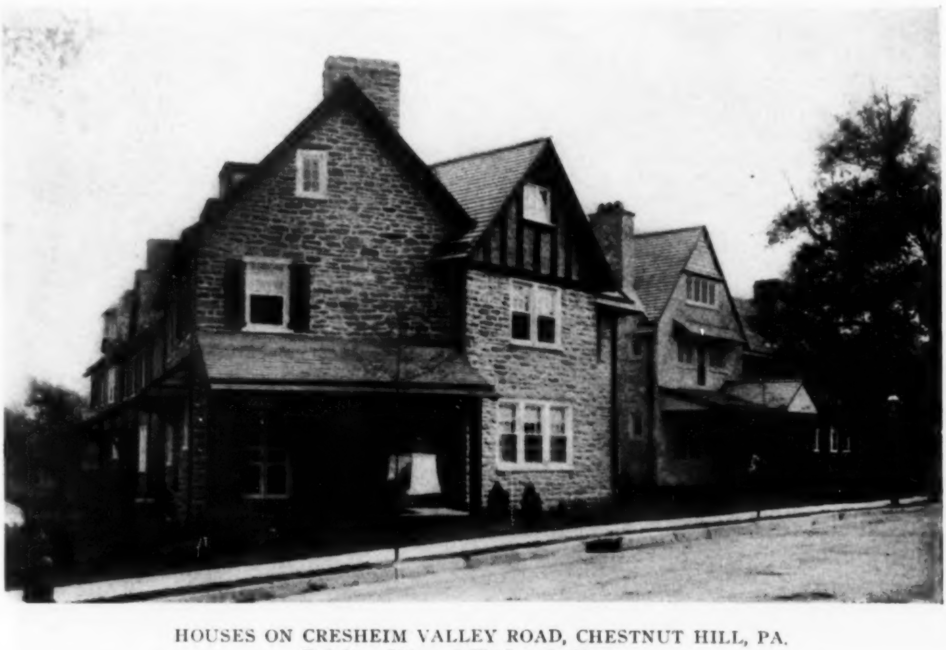
themselves, but creating as well so instant a demand as to occasion a "waiting list" of prospective tenants.

A discussion of the latter phase of the question, written by the owner, appears in a part of an article on this housing development in the July (1913) issue of the ARCHITECTURAL RECORD, with illustrations of the "quadruple" houses mentioned above, and it is the purpose of this article to illustrate the "twin," or semi-detached houses in the same group (shown in the block plan on this page), as well as to enlarge upon some others, and more general aspects of the subject.

It was said above that certain achievements in the housing problem have shown that the "ready-made" house need not be utterly wretched from standpoints structural and esthetic, but it has been left to

DOUBLE HOUSES ON BENEZET ST., CHESTNUT HILL, PA.
Duhring, Okie & Ziegler, Architects.

HOUSES ON CRESHEIM VALLEY DRIVE, CHESTNUT HILL, PA.
Duhring, Okie and Ziegler, Architects.



HOUSES ON CRESHEIM VALLEY ROAD, CHESTNUT HILL, PA.
Duhring, Okie and Ziegler, Architects.

A DOUBLE HOUSE ON BENEZET ST. (REMODELLED FROM AN OLD BARN), CHESTNUT HILL, PA.

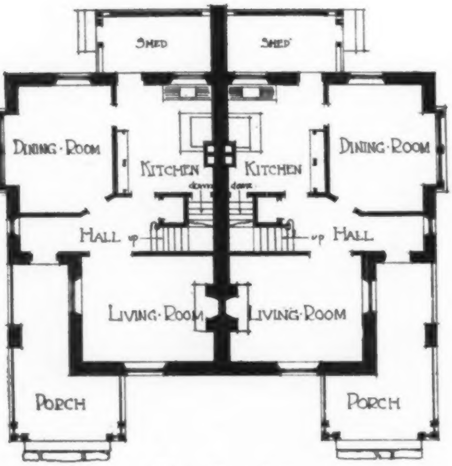
AN OLD HOUSE REMODELLED, NO. 7921 GERMANTOWN ROAD, CHESTNUT HILL, PA.
Duhring, Okie and Ziegler, Architects.

PORCH DETAIL—DOUBLE HOUSE ON BENEZET ST., CHESTNUT HILL, PA.
Duhring, Okie & Ziegler, Architects.

the Philadelphia firm of Duhring, Okie & Ziegler to demonstrate that this type of house may even be made remarkably attractive. A certain part of the success of this demonstration may be due to the general prevailing expression of domesticity given by nearly all the Philadelphia architects to their rendering of residential architecture. In no part of the country is to be noted such consistency in country and suburban house design as obtains in and around Philadelphia.

That a group of severally intangible but collectively potent qualities of domesticity should be expressed in a given house for a given individual is by no means remarkable, but that these qualities should be effectively imparted to the houses on a real-estate development is eminently worthy of note and commendation.

While the several houses built upon this Chestnut Hill tract in the suburbs of Philadelphia possess in themselves a



First Floor Plan.
TWIN HOUSES ON BENEZET ST., CHESTNUT HILL, PA.
Duhring, Okie & Ziegler, Architects.

certain individuality, they give at the same time a distinct impression of consistency and unity in intent.

The houses on Cresheim Valley Road illustrate this point in the clever diversity of their arrangement. The entrance is on the gable end of one, but on the front of the next, though both are similarly detailed. From the fieldstone and half-timber of the adjacent "quadruple house" there is a pleasant transition to the "rough-cast" stucco exterior of the double house which gives place, in a manner by no means distracting to the eye, to the all-fieldstone exterior of the next.

Along Benezet Street there is a certain uniformity without monotony—the architects have shown that a little study and a few changes in their drawings for the exteriors may produce that happy diversity which alone can save a row from its too-usual tiresome repetition of one idea.

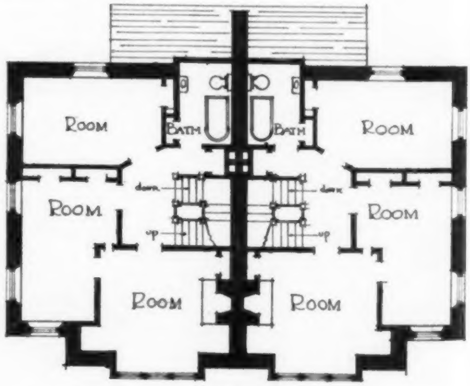
It is interesting to note the simple nature not only of the actual materials used, but also of the detail of the several parts. There are no stock ideas—no carpenters' scroll-saw "ginger-bread"—and certainly no shoddy construction and no suggestion that six houses, if done in a hurry, may be erected for the cost of one built carefully.

Perhaps the type of architecture exemplified by this recent suburban work by Duhring, Okie and Ziegler would not find favor outside the immediate vicinity of Philadelphia. This, however, is to be attributed to a quality of a sane architectural taste which the locality enjoys in contrast to the too-diverse inspirations of so many other suburban places. The Philadelphians revere local precedent in architectural ideals, and, knowing a good thing when they see it, have not found it advisable to experiment in a dozen non-indigeneous styles.

In the architectural good taste prevalent in and about Philadelphia is to be seen, indeed, the hope and promise of a lasting and sincere type of truly American architecture—a style which is good because it is entirely logical.

Much is written and said of a needful betterment in American architecture, but when work of this character, even if rare, is demonstrated to be practically profitable, and if architects rigidly maintain such high standards of architectural taste and honesty in this type of building as have been evidenced in the development of this Chestnut Hill tract, certainly we are upon the threshold of a new era.

And one house of this type, well designed, must go further toward leavening (and ultimately transforming) the great bulk of American architecture, than six well-designed but economically unattainable country palaces.



Second Floor Plan.
TWIN HOUSES ON BENEZET ST., CHESTNUT HILL, PA.
Duhring, Okie & Ziegler, Architects.

TWO PAIR OF DOUBLE HOUSES ON BENEZET ST., CHESTNUT HILL, PA.
Duhring, Okie & Ziegler, Architects.

A DOUBLE HOUSE ON BENEZET ST., CHESTNUT HILL, PA.
Duhring, Okie & Ziegler, Architects.

The QUESTION OF HEAT & VENTILATION

BY CHARLES L. HUBBARD, ENGINEER

II. Problems Connected With Hospitals and Institutions.

THE large number of hospitals of various kinds and sizes which are being erected in different parts of the country brings to the special attention of the architect the matter of heating and ventilation for this particular class of buildings.

The requirements of hospital work are somewhat peculiar, and present a considerable variety of problems requiring especial study. Larger volumes of air are necessary than in other buildings, and especial attention must be given to the removal of dust and other impurities before delivering it to the wards. Simple methods of cooling the buildings, as much as possible, during the hottest days of the summer are among the details which must be worked out with a good deal of care.

Temperature regulation is important and provision must be made for perfecting this to a considerable extent, even where economy of construction is a matter to be carefully considered. The heating and ventilating of a modern operating room is a problem in itself, for the arrangements must be such as to prevent the falling of cool air from the large windows and skylights upon the patient during the operation. Furthermore, in addition to the regular air supply, provision must be made for quickly removing the fumes of ether from the room at any time it is necessary or desirable. Cooking, sterilizing, and laundry equipment must be provided for when laying out the steam plant, as well as hot water service for toilet purposes.

The subject of hospital ventilation will be treated under three heads; the first taking up general matters which apply more or less to all hospital work, while the second and third will deal with details of design and construction applying to cottage hospitals and large city institutions, respectively.

AIR REQUIREMENTS, AND HOW COMPUTED.

The volume of air to be supplied to any building, whatever its use, is usually determined by assuming a standard of purity, based on the number of parts of carbonic acid gas allowable in each 10,000 parts of air. While the presence of this gas in a free state is neither disagreeable nor especially harmful, its effect is to decrease the readiness with which the carbon of the blood unites with the oxygen of the air, and therefore, when present in sufficiently large quantities, may cause, indirectly, not only serious, but fatal results. The real harm of ordinary vitiated atmosphere is caused by the minute organisms which are given off in the process of respiration, and as these exist in a fixed proportion to the amount of carbonic acid present, the latter serves as an indicator to the quality of the air. For this reason practically all tests for air purity are based on the proportion of carbonic acid found in the sample.

For the conditions of hospital work the proportion of carbonic acid should not exceed 5 to 6 parts in 10,000 of air; and as the average outside air commonly contains about 4 parts, it is evi-

dent that only a very small increase is allowable in this class of work. Assuming the average production of carbonic acid gas by an adult at rest to be 0.6 cubic feet per hour, and the outside air to contain 4 parts in 10,000, the cubic feet to be supplied per hour per occupant may be found by dividing 6,000 by the allowable increase in carbonic acid per 10,000 parts of air.

For example, to maintain a standard of purity of 5 parts in 10,000, the air supply should be $\frac{6{,}000}{5-4} = 6{,}000$ cubic feet per hour per occupant, and for a standard of 6 parts in 10,000, it should be $\frac{6{,}000}{6-4} = 3{,}000$ cubic feet, and so on.

HEAT NECESSARY FOR VENTILATION.

The heat necessary for ventilating purposes is that required for raising the temperature of the entering air from that outside to the normal inside temperature of the building, which is commonly taken as 70 degrees, and is entirely independent of that required for heating. This is computed by the formula:

$$H = \frac{V \times T}{55}, \text{ in which}$$

H = the heat quantity required, in thermal units (T. U.);

V = the volume of air supplied, in cubic feet per hour;

T = the rise in temperature, in degrees Fahrenheit.

The factor $\frac{T}{55}$ for different values of T may be taken as follows:

TABLE I.

Value of T	Value of T ÷ 55
30	0.55
40	0.73
50	0.91
60	1.09
70	1.27
80	1.46
90	1.64
100	1.82

Hence, to find the T.V. required under any given condition, multiply the air supply in cubic feet per hour by the factor for the corresponding rise in temperature taken from Table I.

When determining the size of the boilers, heaters, etc., for ventilating purposes, they should be proportioned for maximum capacity, which is commonly taken for a temperature rise of 70 to 80 degrees in New England and the North Atlantic States.

When computing the *cost* of ventilation, the *average* outside temperature for the heating season should be used, which for the same localities will run from 30 to 40 degrees above zero, thus making the required rise from 30 to 40 degrees in place of 70 to 80, as in the case of *capacity*.

Unless the building is in an especially exposed location it is customary to assume values of T of 70 and 35 for *maximum* and *average* conditions respectively.

COST OF VENTILATION.

With boilers of good design, and well cared for, about 8,000 T.U. will be utilized from each pound of coal burned on the grates. Therefore, the total T.U required for ventilation, for a given period, divided by 8,000, will give the pounds of coal necessary, from which the cost can be easily computed.

For example, a hospital building is to be supplied with 500,000 cubic feet of air per hour, 24 hours per day. Assuming the heating season to be 220 days in length, with an average outside temperature of +35 deg., what will be the cost of ventilation with coal at $3.50 per ton?

$$\text{Solution: } \frac{24 \times 220 \times 500{,}000 \times 35}{55 \times 8{,}000}$$

= 210,000 pounds of coal required, at a cost of $\frac{210{,}000}{2{,}000} \times \$3.50 = \$367.50$.

HEAT LOSS FROM BUILDINGS.

As stated in a previous article, the heat loss from a building, which must be replaced by some form of heating system, is due to transmission through walls and windows, and to air leakage, both inward and outward. The rate of heat transmission depends upon the thickness and material of the building walls, and the difference between inside and

outside temperatures; while leakage is affected by the tightness of construction and strength of the wind. Formulæ and tables for the rate of heat transmission are mostly based upon actual tests, supplemented by practical experience.

The following corresponds well with average practice and gives the transmission in T.V. per hour per square foot of exposed surface for different building materials of varying thickness. Results are given for temperature differences of 60, 70 and 80 degrees, which cover the usual range of heating. If other conditions are to be provided for the rate of transmission is easily determined, as it varies directly as the temperature difference. While this table is given in connection with hospital work, it may be used for any other type of building to which it applies.

TABLE II.

Building Material	Temp. Difference 60°	70°	80°
8" Brick Wall	27	31	36
12" Brick Wall	20	23	26
16" Brick Wall	16	19	22
4" Reinforced Concrete	57	65	74
8" Reinforced Concrete	35	40	47
12" Reinforced Concrete	26	30	34
Ordinary Wooden Construction	16	19	22
Slate on Matched Boards	18	21	24
Tar and Gravel Roof	18	21	24
Unlined Metal	48	56	64
Wood Floor on Joints	19	22	25
Cement Floor	18	21	24
Single Window	73	85	98
Double Window	48	56	62
Double Skylight	42	48	56

These figures apply to a southern exposure and should be increased as follows for other points of compass: North, 1.32; east, 1.12; west, 1.20. While this general method of computation has been given in a previous article, the use of Table II gives it a much broader application. The loss from leakage depends upon the tightness of construction and may be provided for by increasing the heat loss from transmission by the factors previously given, that is, for good construction, multiply by 1.1; for fair construction, multiply by 1.2; and for poor construction, multiply by 1.3;. In case of very exposed locations it may be necessary to increase the total computed heat loss 10 per cent. or more, according to local conditions.

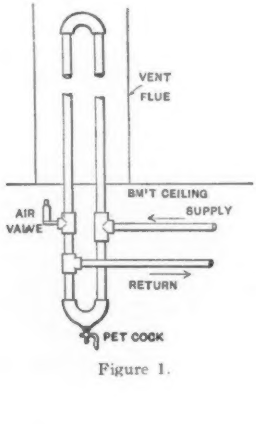


Figure 1.

TYPES OF RADIATION FOR HOSPITAL WORK.

All direct radiation used in hospitals should be of a plain and open pattern so that all parts may be easily reached for cleaning. It is also desirable that the radiator be supported upon the wall, thus leaving the floor free from all obstructions for the accumulation of dirt. Radiators of this general type are now on the market and are made up with smoothe surfaces and wide spaces between the sections. Connecting corridors and similar rooms, when heated with direct surface, are often provided with circulation coils of 1¼-inch pipe. This form of surface is fairly easy to care for when set out well from the wall to allow sufficient space for cleaning behind it.

For indirect gravity heating, any good form of indirect section may be used, but the casing should be made up with bolts, so that it may be easily removed for a thorough cleaning of the heater from time to time.

Aspirating coils for the acceleration of air flow through vent flues are commonly made in the form of a loop, of the general design shown in Fig. 1, for flues from a single ward or toilet, when the sectional area, does not exceed about 1 square foot. Loops of this kind are made of 1-inch pipe, and about 10 feet high. For larger flues, or where a number of smaller ones are brought into a single chamber and the air discharged through a common outlet. About 40 square feet of heating surface should be provided for each 1,500 cubic feet of

air passing through the flue per minute. Heaters for this purpose should extend over the whole area of the flue, instead of being placed in the center, as is often done. They should be of open pattern with a free area between the pipes equal to the sectional area of the flue. Assuming one-half the over-all, or superficial, area to be free for the passage of air, it is only necessary to give the heater the same width as the flue, make the height of the pipes twice the depth, and place it in an inclined position, as shown in Fig. 2. Heaters of this type, made up

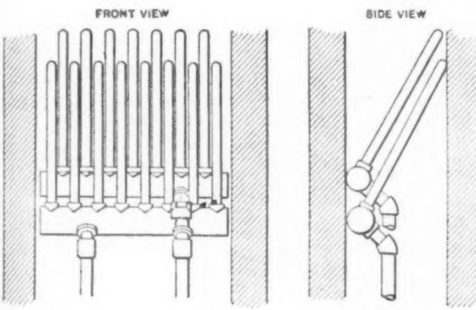


Figure 2.

of Nason tubes screwed into branch tees for bases, are found to be very satisfactory.

LOCATION OF RADIATORS AND REGISTERS.

Direct radiators are hardly ever used in hospital wards except occasionally in connection with some form of ventilating system, and then usually for use in extremely cold weather.

They are employed, however, in bath and toilet rooms, diet kitchens, serving rooms, store and linen rooms, and in connecting corridors, where supply ventilation is not required. While the logical place for a radiator is in the coldest part of the room beneath the window, it does not make any material difference in the case of small rooms, and the arrangement of furnishings is usually considered as equally important with the location of the radiator. In corridors, etc., where circulation coils are used, they should be run beneath the windows on the colder or more exposed side.

Indirect stacks or heaters should be placed close to the bases of the flues which they are to supply, and the warm air is best brought into the rooms through wall registers, either in, or just above, the baseboard.

These are commonly located in the outer wall and preferably beneath the windows, if convenient, although the arrangement is not necessary.

With a fan system, where larger volumes of air at a lower temperature are supplied, the inlet registers are usually located in the wall about 7 feet from the floor, the same as in school rooms.

SIZE OF RADIATORS.

The size of radiators may be determined the same as for dwelling houses; that is, by dividing the total heat loss from transmission and leakage by the radiator efficiency for direct radiation, which may be taken as 250 for steam; 170 for hot water under gravity circulation; and 190 for hot water under forced circulation. For indirect steam, multiply the heat loss by 2.7 and divide by 450; for indirect hot water, under gravity circulation, multiply by 3 and divide by 340; and for hot water, under forced circulation, multiply by 2.9 and divide by 370.

SYSTEMS OF STEAM HEATING.

Low pressure gravity steam heating (2 to 5 pounds pressure) is adapted to buildings of small size, and where the ground area is small compared with the height of the building.

To work satisfactorily, the horizontal returns should be of moderate length and sealed if possible. The condensation may be returned to the boiler either by gravity or may be trapped into a vented receiver and pumped back, according to the size of the plant and the general arrangement of the system. Details of the piping for both of these methods will be taken up in a following article.

For large buildings, with long horizontal runs of piping, and especially in the case of cottage hospitals and large institutions made up of a number of separate buildings, a vacuum system, where a suction is attached to the main return in the boiler house, usually gives the best result.

The size and arrangement of the radiators are practically the same as for a gravity return; also the method of making the pipe connections, except the two-pipe system, must always be used. The only difference at the radiators is the substitution of a thermostatic or motor valve in place of the usual hand valve on the return end. This particular form valve is so constructed that it will open to admit the passage of air and condensation but closes in the presence of steam, thus sealing the system of radiators against the return piping and so preventing short-circuiting through sections of the system nearest the boilers. Furthermore, by maintaining a certain difference in pressure between the supply and return mains, it is possible to secure a considerable temperature range within the individual radiators by means of graduated or fractional supply valves, which make it possible to vary the amount of steam admitted to them. Among other advantages of the vacuum system may be mentioned the ability to carry pressures considerably below that of the atmosphere, thus making it especially adapted to combined power and heating plants, where it is not desirable to increase the back-pressure upon the engines. Also, by attaching a suction to the main return, a rapid circulation is obtained through the system when steam is first turned on and the water of condensation is quickly removed from long runs of horizontal piping without surging or water hammer.

The general principle of this system of heating is shown in Fig. 3, and is practically the same as for ordinary low-pressure heating except for the points noted above. Referring to Fig. 3, it will be seen that the condensation is discharged into a vented receiver by the vacuum pump, where the air and water are separated before the latter is returned to the boilers by the feed pump. Other special features of the system are noted on the drawing and therefore do not require special mention.

The pipe sizes vary somewhat with the apparatus furnished by different manufacturers, but the following may be taken as a fair average.

TABLE III.

Size of steam pipe, ins.	Size of return pipe, ins.	Square feet of direct radiation	
		200 feet run	400 feet run
1	½	80	50
1¼	¾	150	100
1½	¾	250	175
2	1	500	350
2½	1	900	650
3	1¼	1,500	1,000
3½	1¼	2,200	1,600
4	1½	3,200	2,300
5	1½	5,600	4,000
6	2	8,700	7,000
7	2	14,000	10,500
8	2½	20,000	15,000
9	2½	26,000	20,000
10	3	35,000	27,000

When connected with indirect surface, count each square foot as two of direct.

In determining the size of vacuum pump, the following may be used in the absence of more definite data.

TABLE IV..

Square feet of direct radiation.	Size of Vacuum Pump. (Single, double acting.)
2,500	4" × 5"× 6"
5,000	4" × 6"× 7"
10,000	5½"× 8"× 7"
17,000	6" × 9"×10"
25,000	6" ×10"×12"
35,000	8" ×12"×12"

Certain systems of vacuum heating are patented, and when one of these is employed the proportions of the various parts are best obtained from the makers.

When the thermostatic or other return valves are purchased outright, and installed by an independent contractor, the sizes of equipment given above may be used.

Another form of vacuum system is shown in Fig. 4. In this case the steam connections remain the same as in the

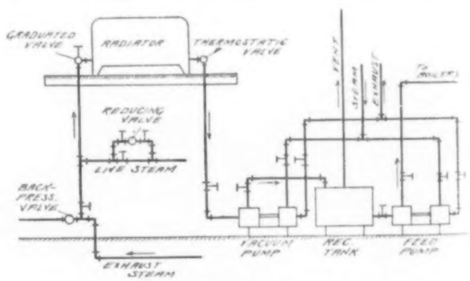


Figure 3.

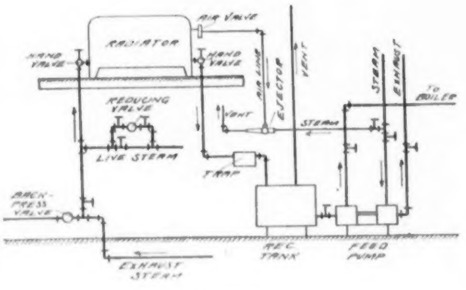


Figure 4.

low-pressure gravity system, but the usual air valve is replaced by one of special form which connects with a vacuum line in which the suction is produced either by a pump or ejector. This arrangement simply affects the removal of air from the radiators and has nothing to do with the return of the condensation, which flows back to the boiler or receiver by gravity the same as in the pressure system, and therefore is not so well adapted to the draining of long horizontal pipes as the first described, where a suction is applied directly to the main return.

SYSTEMS OF HOT-WATER HEATING.

The common system of gravity circulation, such as is commonly used in

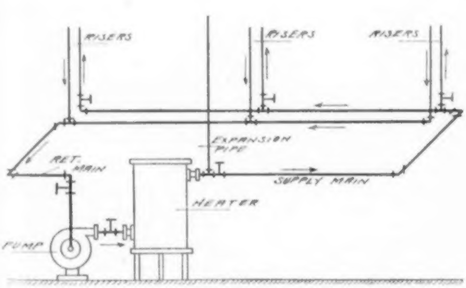


Figure 5.

dwelling houses, is not usually employed in hospitals except for those of small size. In the case of large buildings, and cottage hospitals where the wards are more or less scattered, it is necessary to use a pump for forcing the water through the mains. One of two systems of piping is commonly used for this work. In the two-pipe system, Fig. 5, the supply and return are carried side by side, the former reducing in size and the latter increasing as the branches are taken off. As the difference in pressure between the mains is greatest nearest the pump, it is necessary to place throttle valves in the risers to prevent short-circuiting, and to secure an even distribution through all parts of the system. In the single-pipe, or circuit system, Fig. 6, a single main of uniform size is carried entirely around the building, one end being connected with the suction and the other with the discharge of the pump, as indicated in the cut. Supply risers are taken from the top of the main and the corresponding

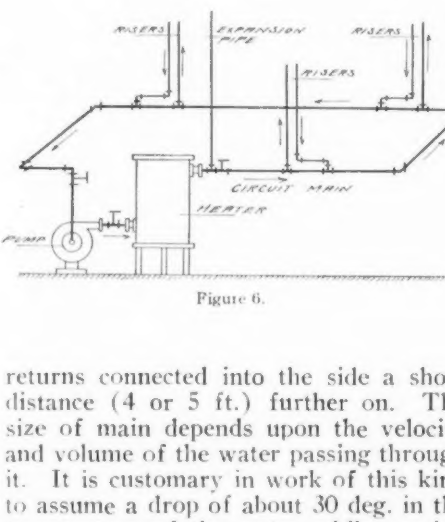


Figure 6.

returns connected into the side a short distance (4 or 5 ft.) further on. The size of main depends upon the velocity and volume of the water passing through it. It is customary in work of this kind to assume a drop of about 30 deg. in the temperature of the water while passing through the system, which causes each gallon of water to give out 250 T.U. Under these conditions 1 gallon of water per hour should be circulated through the system for each square foot of direct coil surface, and the same amount for each 1.3 square feet of cast-iron radiation. Here, as previously noted, each square foot of indirect surface may be taken as equivalent to 2 of direct cast-iron radiation. Having determined the volume of water to be moved, the size of main is usually based on an assumed velocity of flow, which varies with the size of pipe. This is not

arbitrary, but custom has established rates of flow approximately as follows:

TABLE V.

Dia. of pipe in inches.	Velocity of flow, in ft. per min.	Gallons circulated per min, at this velocity.
3	250	100
4	300	200
5	350	350
6	400	600
7	450	900
8	500	1,300

Example: A building contains 26,000 square feet of direct cast-iron radiation, what should be the size of the supply and return mains for forced hot-water circulation?

$$\frac{26{,}000}{1.3 \times 60} = 333$$ gallons of water to be circulated per minute, which, from Table V, we find calls for a 5-inch pipe.

The size of supply risers between the main and radiators may be taken as follows:

TABLE VI.

Square feet of direct radiation.	Size of supply and return risers for circuit system (Fig. 6). Ins.	Size of supply and return risers for two-pipe system (Fig. 5). Ins.
30	¾	¾
60	1	¾
100	1¼	1
150	1½	1¼
300	2	1½
500	2½	2
800	3	2½

While the ordinary steam pump, of the plunger type, is often used for this class of work, the centrifugal pump is more frequently employed for this class of work. It is simple in construction, having no valves, and is usually driven by a direct-connected steam engine, turbine, or electric motor. As the water in a heating system is under a state of equilibrium, the only power necessary to produce a circulation is that required to overcome the friction in the mains and radiators, and as the passageways through the latter are large as compared with the former, it is sufficiently accurate, under ordinary conditions, to consider only the mains.

The pressure or "head" for forcing the water through the mains commonly runs from 30 to 40 feet, and should not in general exceed 50 or 60 feet as a maximum.

The head required for this purpose will vary with the size of pipe, number of bends, length of run, and velocity of flow through it. With the sizes and velocities given in Table V, the required head will be about 3 feet per 100 feet length of run, which will include the usual number of bends. For example, the pressure head required to force water through a 5-inch main 1,000 feet in length, at a velocity of 350 feet per minute, is 3x10 = 30 feet, which is equivalent to 30x0.4 = 12 pounds pressure per square inch.

The proportions of a centrifugal pump for a given capacity and pressure head will depend upon the speed at which it is to be operated. Table VII gives data for pumps at comparatively high speeds adapted for direct connection with electric motors or steam turbines.

Pumps for lower speeds, to be used with steam engines, may be obtained when desired.

For example, a 5-inch pump running at a speed of 910 revolutions per minute will circulate 730 gallons of water against a head of 30 feet, and will require 0.309x30 = 9.27, or in round numbers, a 10 H. P. motor for driving it.

The water for a system of this kind is commonly heated by steam in an ordi-

TABLE VII.

Size of pump, Discharge, in inches.	Gallons of water moved per min.	Head produced, in feet, at different revolutions, per minute. 20	25	30	35	40	Diam. of impeller, in ins.	Horsepower required for each foot head
3	240	1,020	1,130	1,220	1,320	1,400	9	0.136
4	430	875	970	1,050	1,130	1,195	10	0.217
5	730	765	840	910	970	1,030	11	0.309
6	1,050	710	780	845	905	960	12	0.446
7	1,440	605	670	720	775	820	14	0.606
8	1,880	525	580	630	675	715	16	0.791

nary form of feed water heater, although it may be done directly in a boiler, without the use of steam, the same as with gravity circulation. The reason for employing steam is that this system of heating is commonly used in combined power and heating plants, and the exhaust from the engines utilized in this way. When more heat is required a live steam heater is employed in connection with the exhaust heater as shown in Fig. 7, or live steam at a reduced pressure may be mixed with the exhaust, provided the oil in the latter is thoroughly removed so that the condensation may be returned to the boilers.

The square feet of tube or heating

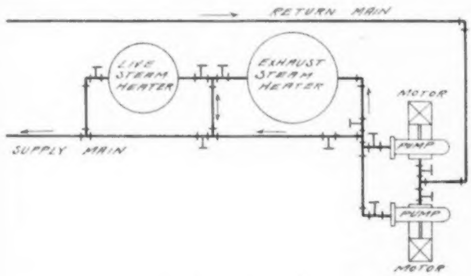


Figure 7.

surface in the heater will depend upon whether the water or steam is inside the tubes. With the water inside, there should be 1 square foot of heating surface for each 40 square feet of direct cast-iron radiation, while with steam in the tubes, and water on the outside, the ratio should be reduced to 1 to 25. This applies to low-pressure steam at atmospheric pressure or slightly above.

As commercial feed-water heaters are rated on a basis of 1/3 of a square foot of tube surface per horsepower, the rating of the heater may be found by multiplying the required tube surface by 3.

COMBINING HEATING AND VENTILATION.

It is customary in the case of hospitals to combine the heating and ventilating systems in the wards and all other important rooms and thus do away with direct radiation, as far as possible. This is done in small buildings and cottage hospitals by using indirect stacks with a gravity air supply of generous proportions, while in larger buildings, fans and hot-blast heaters are employed almost entirely in the best class of work. Details of both of these systems will be taken up in later articles.

TEMPERATURE REGULATION.

A very important detail of any system of heating is the regulation of the temperature, and this is especially true in the case of hospitals. In small buildings, heated by steam, mixing dampers are commonly provided at the indirect stacks and so arranged as to be operated from the rooms with which the various flues connect. These dampers are so designed as to by-pass a portion of the entering air around the heater, and so admit to the room above a mixture of such proportions of hot and cold air as to give it the desired temperature. The only method of controlling the temperature in rooms heated by direct steam is by opening and closing the valves at the radiators. When a vacuum system is employed, a small amount of regulation may be secured by varying the steam pressure by means of the reducing valve, and if graduated valves are provided, still more control is available in individual rooms.

Hot water gives a simple method of regulation, so far as the entire system is concerned, either by varying the temperature of the water or the rate of circulation by changing the speed of the pump.

Individual regulation at the radiators may be obtained to some extent by throttling the valves, but this is a rather difficult thing to do unless a special graduated valve is employed.

The best arrangement, and one which should be used if available funds will allow, is one of the pneumatic systems of temperature regulation which is entirely automatic in its action, except for the usual amount of care and adjustment which any device of this kind requires.

This apparatus consists of three essential parts; (1) an air compressor, usually operated by water pressure in small and medium sized plants and by steam or electricity in larger ones; with a reservoir and system of distributing pipes; (2) thermostats to be placed in

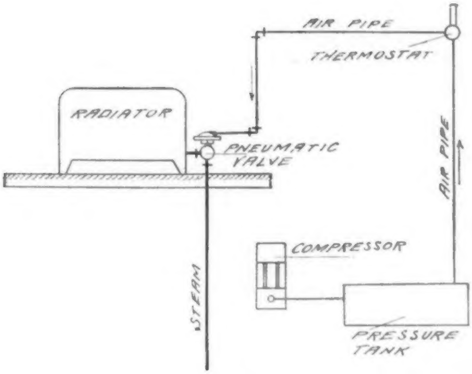


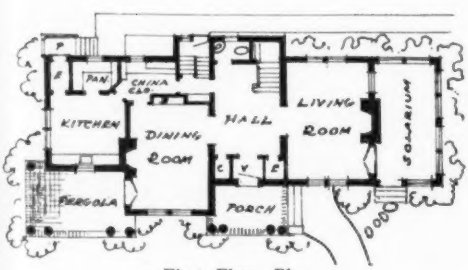
Figure 8.

the various rooms to be controlled; (3) pneumatic valves upon the radiators, or diaphragm attachments at the mixing dampers.

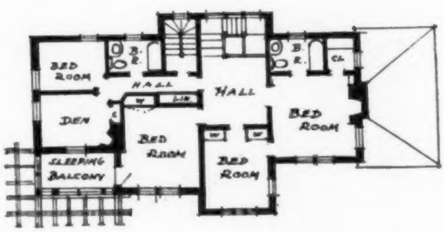
A thermostat is simply a mechanism for opening or closing one or more small valves, and is actuated by changes in the temperature of the air in which it is placed. When the room becomes too warm the movement caused by the expansion of a metal strip, or the vaporizing of a volatile liquid, opens a small valve and admits air from the pressure tank through the thermostat into the pneumatic valve, thus closing it and shutting off the steam or water supply. When the temperature of the room again drops below the normal for which the thermostat is set a reverse movement takes place, and the air pressure on the pneumatic valve is released, causing it to open and admit the flow of steam or water to the radiator again.

The arrangement of the different parts of this system, as applied to a steam radiator, is shown in Fig. 8, which needs no description further than given by the notes upon the drawing. When applied to the operation of a mixing damper, a "graduated" thermostat should be used instead of the regular form. The construction of this is such that a gradual movement is obtained, which holds the mixing damper in such a position that the right proportions of warm and cool air are delivered to the room to maintain the desired temperature. Were the "regular" form of thermostat used under these conditions the damper would be thrown to give either all hot air or all cool air, and it would be impossible to obtain a mixture of the proper temperature. When applied to hot-blast heating and ventilation in connection with a fan, the room thermostat is connected with a supplementary heater at the base of each individual flue, or with a mixing damper, when the double-duct system is used. A case of purely ventilating systems, where the air is delivered to the rooms at a constant temperature of 68 or 70 deg., a special hot-air thermostat is placed in the main airway beyond the fan and connected with one or more sections of the main heater, or with a bypass damper which allows a certain proportion of cool air to pass around it.

PORTFOLIO OF CVRRENT ARCHITECTVRE

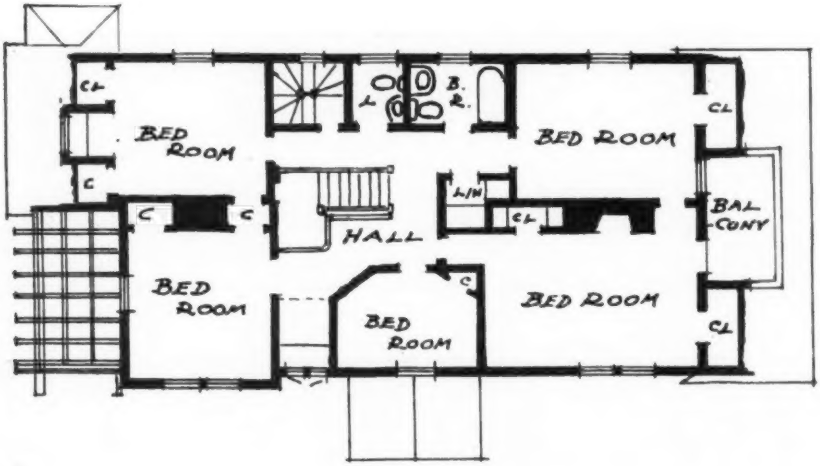


First Floor Plan.

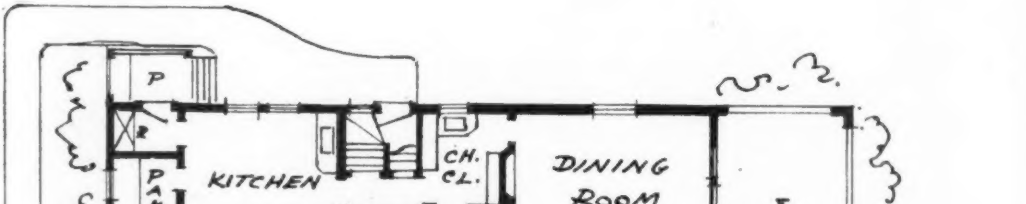


Second Floor Plan.

RESIDENCE OF WALDO L. HART, ESQ., ABERDEEN, MASS.
W. Northrop Dudley, Architect.



Second Floor Plan.



First Floor Plan.

RESIDENCE OF GEORGE W. WARWICK, ESQ., BELMONT, MASS.
W. Northrop Dudley, Architect.

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W. NORTHROP DUDLEY, ARCHITECT.

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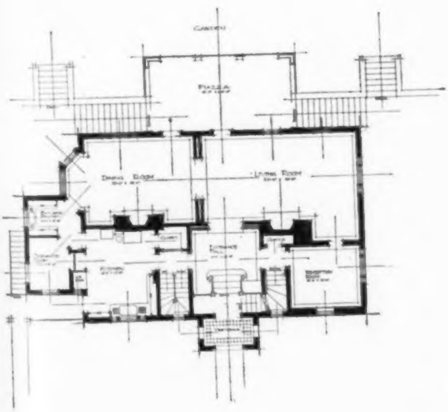
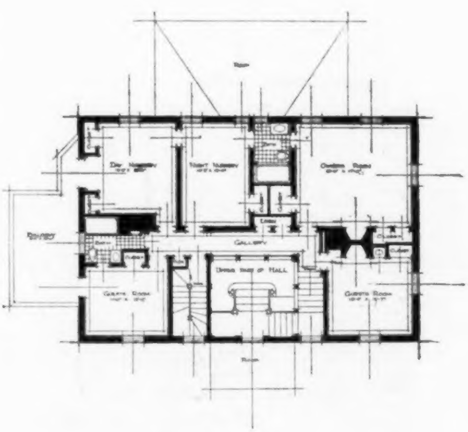
RESIDENCE OF PROF. JOHN M. BERDAN, NEW HAVEN, CONN.
Murphy and Dana, Architects.

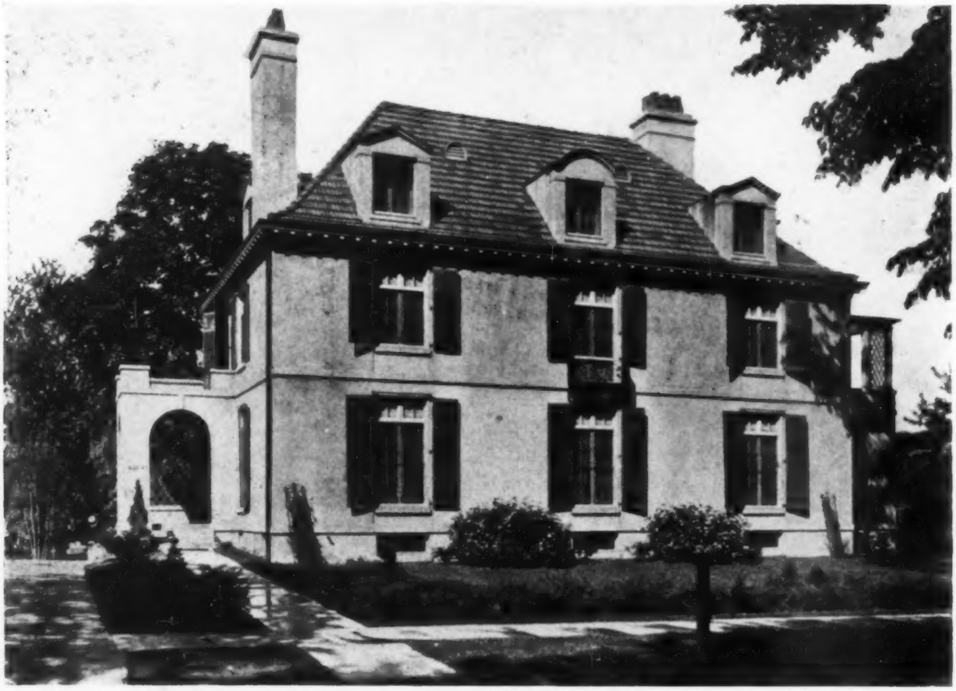


First Floor Plan.



Second Floor Plan.

RESIDENCE OF PROF. JOHN M. BERDAN, NEW HAVEN, CONN.
Murphy and Dana, Architects.



RESIDENCE OF CHARLES S. DeFOREST, ESQ., NEW HAVEN, CONN.
Murphy and Dana, Architects.

First Floor Plan.

Second Floor Plan.

RESIDENCE OF CHARLES S. DeFOREST, ESQ., NEW HAVEN, CONN.
Murphy and Dana, Architects.

A HOUSE AT NEW HAVEN, CONN.
MURPHY AND DANA, ARCHITECTS.

WHAT DO WE KNOW ABOUT LIGHTING?

A STUDY THEORETICAL, SCIENTIFIC & PRACTICAL

By F. LAURENT GODINEZ, Consulting Lighting Specialist

V.—ON INDIRECT LIGHTING (Part I)

Photographs by August Patzig & Son

NOTE.—In this article the subject of indirect and partially direct lighting is discussed from many viewpoints. The possibilities of indirect lighting as an aid to architectural expression and in expressing character and individuality in lighting are indicated. Throughout the text photographs are interposed illustrating in an original way the interesting considerations involved. In the next article various installations of indirect lighting will be analyzed from both the viewpoints of the architect and the decorator.—*Editor.*

SEVERAL YEARS have elapsed since the first application was made of what man has so adroitly termed *indirect* lighting. The idea of concealment of source is not new, and like most things startling and original which are for the welfare of mankind it would seem that Nature had indicated the way, for the moon shines down upon us by the Sun's *indirect* light. Indirect lighting had to come. Its advent was authoritatively prophesied in 1902 by Dr. George M. Gould, editor of American Medicine, in Volume I of his Biographic Clinics, in the chapter on the Physiology of Vision, he states, "The millions of dollars spent each year in illumination are in great part wasted and misspent, and by the methods used all the harm is done to the eye that is possible." Then he adds "No room should be lit in such a manner that the individual lights are visible. Illumination should be by transmitted, dissipated, and reflected light. There is nothing more tiring to the eye than numerous separate lights whose images upon various parts of the retina create there a large number of useless and exhausting stimuli from which there is no escape by device or turning!" It was unfortunate that the development of the tungsten lamp should have been attended, by such a dangerous increase in source brilliancy—but in another sense this overbrightness directly precipitated the advent of indirect light—further accelerated by the economic feature of the lamp and its rapid replacement of its predecessors the Tantalum, Metallized Filament—and Carbon type.

Fundamentally indirect lighting, from a utilitarian viewpoint represents the utilization of secondary diffusing areas of large size over the reflecting or diffusing areas of small size typical of direct lighting. With translucent shades of glass, we have a condition where reflected light from a smooth, or diffused light from a rough, inner shade surface is redirected *downward* below the shade over an area limited by the height of the lamps above, and the shape of the redirecting surface. Depending upon the density of the glass forming the shade more or less light is transmitted through the shade towards the ceiling. From a strictly utilitarian viewpoint and without any regard for aesthetic or architectural considerations, from an illuminating engineering viewpoint this light transmitted ceilingward is of very little value because there is not enough of it directed on the ceiling to materially influence the brightness of

the working plane below after the absorption attendant to the several redirections of light from ceilings to side walls, and from sidewalls to floor which must inevitably occur before light impinging on a ceiling can reach the plane below. In proof of this let us consider an interior having a yellow wall and ceiling absorbing 60 per cent. of incident light. We will assume this interior to be illuminated by a 10-inch ground plass ball enclosing a 150 watt clear tungsten lamp. The lumens* emitted in the various directions above and below are as follows:

Angle.		Lumens
0—60°	Effective flux	216
0—90°	Lower hemisphere	505
90—180°	Upper hemisphere	501
0—180°	Total flux	1,006

A ground glass ball was chosen in fairness, so that practically an equal quantity of light is distributed above and below the globe. Of course any *shade* would redirect more light below than it transmitted light *above*.

Starting with 501 lumens in the upper hemisphere it is evident that at least *three* reflections must take place before the light can reach the plane below. Hence,

501 less 60% (300.6) = 200.4 after first reflection.
200.4 less 60% (120.24) = 80.16 after second reflection.
80.16 less 60% (48.09) = 32.07 after third reflection.

While theoretically interiors are not presumed to be occupied by individuals who disregard the practically unrealized idealism of laboratory calculations, we will assume, nevertheless that actual human beings inhabit these premises in question, and that for reasons unknown to an illuminating engineer they have decided to change their wall paper from yellow to light blue having an absorption factor of 75 per cent. Now, without deducting for any of those common sense, practical considerations which are so foreign to the laboratory yet so common in actual practice, we will grant the impossible, admitting for the sake of argument that old lamps give as much light as new, that light can pass freely through dirt on the outer surface of a shade, and that shades and lamps are universally kept scrupulously clean. Yes, admitting all this we will start in our blue room just as we did in the yellow one with exactly the same conditions—free from all disturbing elements of a practical or human nature. Then with the same quantity of light above, as in the first case 501 lumens the following results obtain:

501 less 75% (375.75) = 125.25 after first reflection.
125.25 less 75% (93.93) = 31.32 after second reflection.
31.32 less 75% (23.49) = 7.83 after third reflection.

Therefore, in the first case with *yellow* paper, the net contribution of useful light received by the ceiling and in turn redirected by the side walls to the lower part of the room would be 32.07 lumens or 3.1779 per cent. of the total light emitted by the combination of 150 watt tungsten lamp and ground glass ball, and 6.4 per cent. of its total light in the upper hemisphere.

In the second case with *blue* paper the value remaining after the 3d reflection (7.83) would only represent 0.77 per cent. of the total light of the lamp and ball, and but 1.56 per cent. of its upper hemispherical light.

From this it is evident that in order to obtain any value on a working plane below from light directed toward the ceiling it is necessary to do more than allow it to radiate aimlessly and uneconomically in a haphazard upward direction—in fact every ray of light from a gas or electric lamp must be interrupted by a reflecting surface of the highest reflecting power, and the light from it so distributed over the ceiling area as to be redirected back again at a proper angle. This involves physiological and psychological considerations which we will discuss in the order named, but before leaving the utilitarian aspect we must revert to the analogy existing between the inefficient distribution of light on a ceiling by translucent glass shades, and the placement of a cluster of lamps in a glass bowl without any redirecting

*A lumen is the amount of light required to produce uniform illumination of one foot candle over an area of one square foot.

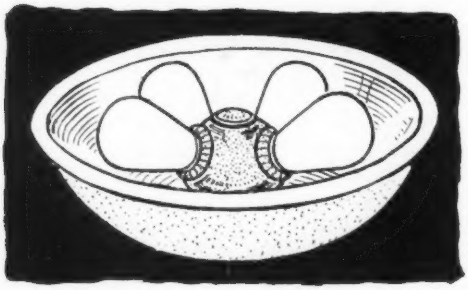


Fig. 1. The mere grouping of base lamps within a glass bowl is wasteful and ineffective—at best a miserable compromise between direct and indirect lighting.

surface other than the inside of the bowl.

The glass maker has produced in opal glass many attractive urns and bowls which lend themselves gracefully to indirect lighting applications. In utilizing these it is necessary, however, to utilize inner reflectors of high reflecting power if any benefit or effect is desired from ceiling diffusion. The mere grouping of bare lamps within one glass bowl without individual reflectors is at best a miserable compromise between direct and indirect lighting. This is because the inner surface of such glassware generally has a negligible reflecting or diffusing (redirective) action, and in practically all instances the light sources are stupidly placed so that their effective distribution can not be utilized. Fig. 1 shows how lights are usually placed in glass bowls, the arrangement having no redeeming feature to justify its perpetration on an unthinking public.

In an article in "Architectural Record" for May, on page 462, Figs. 9 and 10 illustrate how the expression of artistic glassware is destroyed by overlighting. Fig. 2 depicts the correct method of placing light sources within

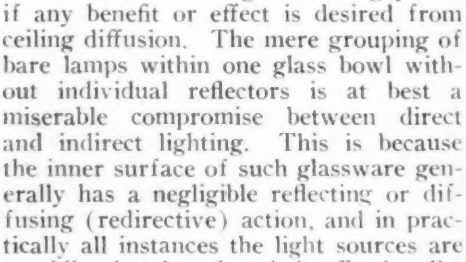


Fig. 2. Correct treatment of indirect lighting equipment in a glass or alabaster bowl.

a glass bowl so as to direct every ray of light from the lamps on the ceiling without waste, a small bare lamp being used below solely for the purpose of adequately expressing the character of the glassware, and enhancing rather than distorting its pictorial value. The arrangement of lamps and reflectors in such a fixture is shown in Fig. 3, which applies when glass bowls of shallow type are used. One of these is illustrated in Fig. 4, showing an etched design which is thrown into decided bas relief when not over saturated with transmitted light. Just as in the case of the genuine Alabaster bowl described in the May issue, page 462, this bowl of American manufacture can be so marred by overlighting that it becomes a glaring splotch of light—an annoyance to the eye—a

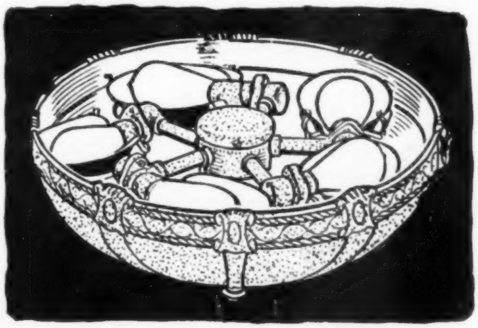


Fig. 3. Top view of the fixture illustrated in Fig. 2. showing arrangement of lamps and reflectors.

distraction, rather than an *attraction* factor.

The value of indirect lighting is that it enables one to use light as an aid to architectural expression, by placing reflectors within formations which are part of the architectural or decorative treatment of an interior. Fig. 5 and 6 illustrate typical ornamentations which lends itself gracefully to such applications. The opaque reflectors described in my article are the best for such usage, for the reason of the permanency and high efficiency of their reflecting surfaces.

This is admirably illustrated by Fig. 7. Within compartments formed by black curtains are six 100 watt tungsten lamps. No. 6 is a flat square of plate

Fig. 4. One of thousands of designs applicable to indirect lighting fixtures.

glass with a quick-silver backing, in other words an ordinary mirror. In comparison with the other cards No. 6 is very dark. This is because the most useful, horizontal light of the lamp radiates without striking any redirecting surface. Consequently, it is not redirected, as is evidenced by the *brightness* of the adjacent side curtain near the lamp, and the darkness of the card (No. 6) below which is receiving only the meager downward light from the lamp tip. In No. 5 is a bare 100-watt tungsten lamp, and by comparing No. 5 and No. 6 it is evident that the flat mirror plate is neither useful nor ornamental — which possibly explains its popularity with the mercantile public in the ceilings of display windows. No. 4 is an ordinary piece of blotting paper in the form of a cone, placed over the lamp so that its horizontal light is intercepted, redirected, and utilized. The difference of intensity on card No. 4 as against Nos. 5 and 6 is remarkable, but attention is directed

Fig. 5. The indirect lighting source can be an urn placed in the corner of a room.

to the fact that the picture is taken on *one* plate. Contrasted with the non permanent blotting paper reflecting surface in No. 4 is a pure silver plated reflector in No. 3, having an absolutely permanent reflecting surface. No. 2 is another type of such a reflector arranged to allow sufficient light to pass above the reflector neck, sufficient to illuminate an enclosing glass bowl. No. 1 is an ordinary opal shade allowing as much light to be transmitted through, and above the shade, as is redirected by its inner surface on the card (No. 1) below.

Fig. 8 shows the comparison booths slightly changed. The mirror plate is still above the 100 watt tungsten in 6,

Fig. 6. Indirect lighting units may be concealed within such urns with varied and interesting effect.

but in 5 an ordinary newspaper has been placed about the bare 100 watt lamp just by punching a centre hole and forcing the lamp through it into its receptacle. Even this newspaper with its very inferior reflecting surface intercepts and redirects considerable light, as can be seen by comparing card No. 5 with No. 6—No. 5 being palpably brighter. In 4 the silvered reflector previously applied has been placed over an inverted Welsbach Reflex gas lamp. The greater brightness of card No. 4 over No. 3 which receives light from a 100 watt tungsten lamp in a silvered reflector is very marked, being due to the greater downward light from the tip of the in-

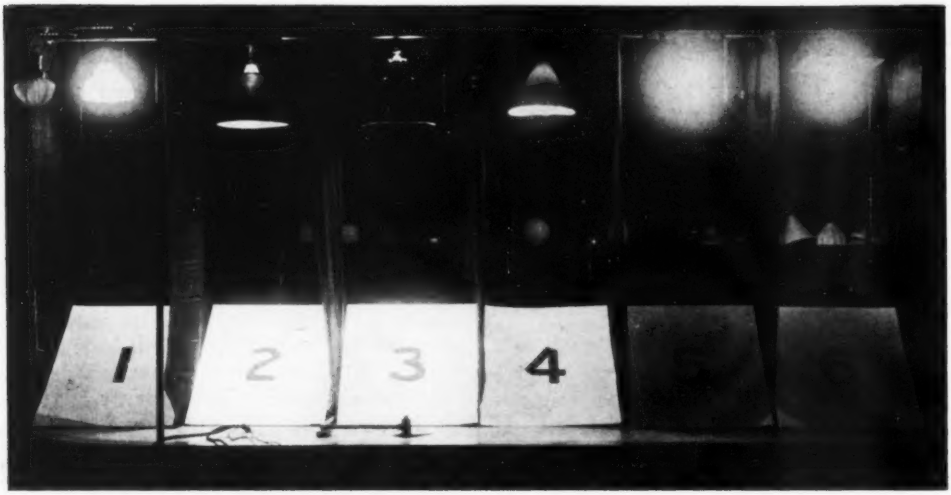


FIG. 7. A COMPARISON SHOWING THE EFFECTS OF VARIOUS REFLECTING SURFACES.

verted gas mantle with its greater light radiating surface at that point. For purposes of comparison the shade of blotting paper has been again placed in No. 2, and in order to illustrate the difference between *transmitted* and *reflected* light from sources of equal size—an inverted Welsbach gas mantle is placed in No. 1 of the same size and type as that in No. 4 but enclosed within an opal ball of light density. A study of booths No. 1 and No. 4 instructively reveals the fact that while card No. 4 is brighter than card No. 1 this merely signifies that the utilization is different—not that the lamp in No. 4 is giving *more* light than that in No. 1, which allows considerable light to be transmitted on the horizontal and above, as evidenced by the brightness of the adjacent side curtain and top bar, as compared with booth No. 4, where no light is transmitted *above* the reflector. The best feature about these comparisons is that they are visible to the eye. Seeing is believing, and in judging lighting equipment the day is at hand when the eye must decide, not the mind, confused by a mass of impractical, theoretical "figures" or "photometric curves," based on the unnatural test conditions of the laboratory. While these comparison booths are much more interesting than comparative figures, actual applications are of even greater appeal. To illustrate the effect of indirect lighting compared with ordinary direct lighting observe Fig. 9. The lantern illustrated is one of a type used on thousands of porches and is presumably intended to light the stairs, reveal the house number and cast a few friendly rays within the vestibule, perhaps in the direction of an obscure keyhole. Within this lantern

Fig. 9. Typical veranda lighting with 40-watt lamp within opal cylinder.

FIG. 8. COMPARISON OF WELSBACH REFLEX LAMPS WITH TUNGSTEN LAMPS, USING VARIOUS RE-DIRECTING AND TRANSMITTING MEDIA.

surrounded by a cylinder of fluted opalescent glass, is a 40 watt tungsten lamp. If this opal glass were conically shaped, and placed apex downward over the lamp, the slope of its sides would cause considerable reduction of light, for reasons which I have fully explained in earlier articles. Now glance at Fig. 10, showing the same veranda lighted indirectly by a 40 watt tungsten lamp within an indirect lighting fixture, consisting of a brass bowl, old ivory finish concealing a reflector of pure silver deposited on glassware. So much discussion has been caused by these two remarkable photos that I have had another taken, showing the verandas of both houses, giving a comparison of the old and the new lighting on one plate. This photo will appear in the October issue in the second part of this article. These photos, Figs. 9 and 10, illustrate admirably the fundamental principles of indirect lighting in so much as utilization of light is concerned. The condition depicted in Fig. 9 is one where light is transmitted through glass so that the valuable *horizontal* light from the pendant source streams aimlessly between ceiling and floor with a strata of darkness above and below. The shadow cast by the porch columns and projected on the side of the next house by the corner street light is well defined, whereas in Fig. 10 with indirect lighting it is hardly noticeable, owing to the equalizing light received by the side wall of the next house from the ceiling above the indirect lighting unit. It is not necessary to use the three-chain suspension indicated in Fig. 10 since the simple bowl required for such applications is will suited to either the single stem or chain.

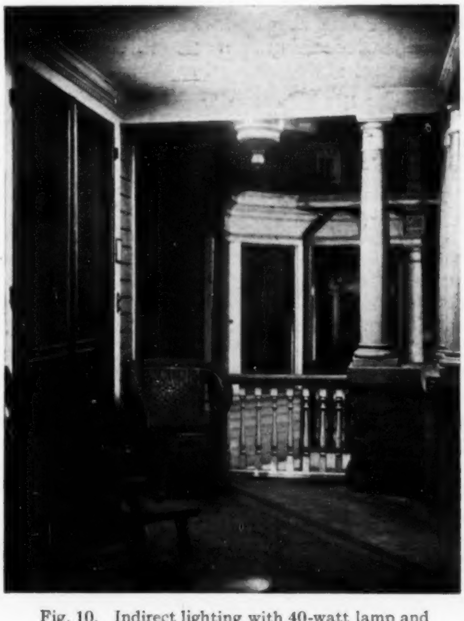
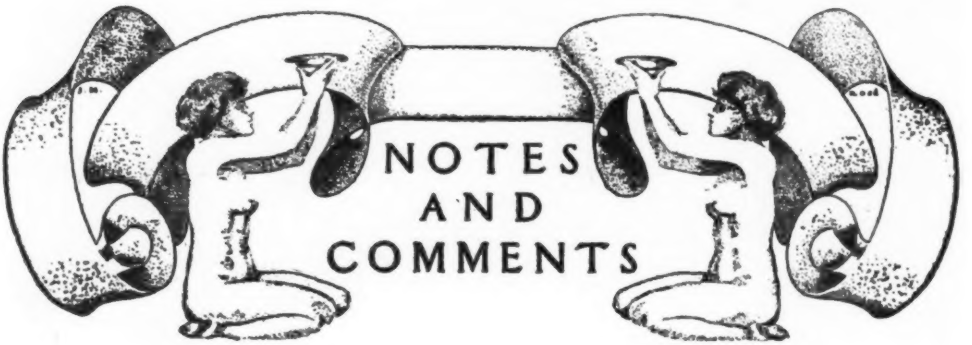


Fig. 10. Indirect lighting with 40-watt lamp and reflector equipment.



A Georgian Revival

It is interesting to observe that Boston has been recently pluming itself on its Georgian architecture. Recognition of the predominance of that style in Boston is not a new thing. Strangers have said before this that Boston is more Georgian in some respects, and perhaps as a whole, than any place of similar importance in England itself. But it is quite a new thing to hear this boastfully said by Bostonians, and to find at least one Boston newspaper proudly calling attention to the fact and urging local architects to devote themselves with an even greater unanimity to this one style. The Transcript, in doing this editorially, makes use of a truly Bostonian phrase, when it says, "There are almost no other American cities where a sophistication of taste exists sufficient for building consciously toward a municipal style in harmony with its historical past."

It is true enough that within the last year or so there has been in Boston a remarkable turning to the Georgian style in the construction of the smaller business buildings. That style has been used heretofore very largely in the town houses of the city and in the designing of institutions, schools, hospitals, town halls, libraries and college dormitories have conformed to the graceful tradition. But until within the last year or so the business building has only occasionally adopted this style. Georgian's virtues are threefold as applied to Boston—adaptability, historical appropriateness and harmony. It must be said, also, that its use is giving to the city a comfortable, homelike look, which sets it apart from the rushing, restless metropolis and that lends to it distinction and character.

A Study of Cities

It has proved a remarkable summer in Europe for the study of city planning. There has been, in addition to the summer school of Town-planning at Hampstead, a scientifically organized Building and Homes Exhibition in Leipsig, an International Road Congress in London—at which one of the leading papers was that presented by Nelson P. Lewis, of New York, and an exhibition and International City Planning Congress in Ghent, while the International Housing Congress is to be held at The Hague in September. If there never has been before such a combination of educational opportunities for the student of city planning, it is by no means certain that with the growing interest in the subject, like opportunities may not come again. Already plans are under way for an International Urban Exhibition to be held next summer in Lyons. A commissioner for the United States has been appointed, and a number of important congresses are to be held.

Of this summer's events, the Ghent Exhibition, the Road Congress and the Housing Congress, are probably the most important. To "The Town Planning Review," Professor Geddes, who had charge of the "Cities and Town Planning Exhibition" there, has contributed a long and characteristic account. With his Carlylse-like mode of expression, and his flood of thought, it is not always easy to tell what Professor Geddes is writing about; but the light which breaks through now and then is so illuminating and stimulating, that to understand even a part makes it worth while to read his descriptions.

It is clear that in the elaborate review of cities which he has prepared for the Ghent

Exhibition, there was arranged an exhibit of such scope and purpose as we have not had before. Divided into a large number of rooms and sections, one passed from cities of classical antiquity—such as Babylon, Jerusalem, Constantinople, Athens and Rome—to the cities of the Renaissance—Florence, Rome, Nancy, etc.—and thence into long galleries devoted to the great modern cities, of America as well as of Europe, which have grown out of these. These galleries led on the one side to a room containing a reference library, and on the other to a room illustrating the development of various civic features (railroad stations, for example) which here were shown, not by cities, but by subjects, so that their development could be traced. Then one passed into a long hall in which was emphasized the human significance of cities, by means of census charts, vital statistics, child welfare exhibits, etc. Beyond this corridor came another series of rooms in which city development was shown from a different viewpoint. Beginning with geographical origins, one passed to mediaeval cities, and thence to a room showing the changes wrought in them by war and time. Then appeared the industrial revolution in its effect upon cities, and beyond this a large gallery devoted to the garden suburb and garden city movement. At the end there was a room given up to Professor Geddes' special hobby, the survey of cities and towns. The obvious purpose of the whole exhibition has been to give to the modern science of city building a historical background, and to indicate the significance of the present as a link between the past and the future of cities.

Building Height and Economics

The letter which Arnold W. Brunner, as Chairman of the Fifth Avenue Commission, has sent to Edward M. Bassett, as Chairman of the Mayor's Height of Buildings Committee, is of interest mainly for its economic arguments. After rehearsing briefly the arguments for a limitation of building height on Fifth Avenue, which were presented in the Commission's preliminary report to Mr. McAneny, the letter continues: "It seems obvious that the heights of buildings should be proportioned to the width of the streets on which they are built. The roadways will accommodate a certain amount of traffic and the sidewalks will take care of a certain number of pedestrians, but as the population of the abutting buildings becomes greater the streets are inadequate. Mr. McAneny has done whatever was possible to increase the capacity of the streets by removing the illegal projections, but there are no more projections to be removed and the streets cannot be widened. We are told that the owner of a piece of property should not have his rights abridged, but his neighbors have rights and the public has rights. We believe that the good of the entire city is more important than the desires of the individual. After conference with many owners of real estate it is gratifying to find that they would welcome a law limiting the height of buildings. It would steady the value of real estate, make it a more permanent investment, and less of a speculation." Mr. Brunner adds that the remarkable increase of population in German cities is evidence, if any were needed, that the restriction of building height does not discourage building, but on the contrary stimulates it. The letter gains not a little of its significance and interest from the fact that so little is said of the aesthetic arguments, which do not seem as yet to have persuaded men, and that such telling points can be made on the economic side.

New York's City Planning Law

The rapidly accumulating body of American city planning legislation has lately received in New York State an addition which has hardly had the attention it deserves. This is in an amendment to the general municipal law which authorizes and empowers each city and incorporated village in the State to create a commission to be known as the city, or village, planning commission. To such commission may be referred, for report and criticism, "the adoption of any map or plan of said city or incorporated village, or part thereof, including drainage and sewer or water system plans or maps, and plans and maps for any public waterfront, or marginal street, or public structure upon, in or in connection with such front or street, or for any dredging, filling or fixing of lines with relation to said front; any change of any such maps or plans; the location of any public structure upon, in or in connection with, or fixing lines with relation to said front; the location of any public building, bridge, statue or monument, highway, park, parkway, square, playground or recreation ground, or public open place of said city or village." Furthermore, the local authorities may provide by ordinance or resolution that

henceforth no street plan or subdivision shall be recorded in the office of the County Clerk until it has been approved by the commission. In the first class cities the commission is to consist of not more than eleven members; in second class cities, of not more than nine members; and in third class cities of seven members. The commissioners may or may not be paid salaries.

Not the least significant fact in regard to this legislation is that the new law was drafted by the city planning advisory committee of the Conference of Mayors of New York State, that committee working in conjunction with the city planning committee of the City Club of New York. The members of the Mayors' advisory committee—all New Yorkers, with one exception—are Arnold W. Brunner, Nelson P. Lewis, Charles Downing Lay, Daniel L. Turner, and Edward Green of Buffalo.

The committee, having secured its legislation, proposes to devote its energies this year to the establishment of a city planning commission in every city of the State. In its report to the Conference of Mayors it very wisely said: "The condition of change and growth requires constant and definite action by city governments looking to proper provision for streets, parks and public buildings. For this reason we believe it is highly desirable that the various city governments should have the advice of a commission of citizens, composed of engineers, architects, landscape architects and business men; and we therefore urge every mayor and his board of aldermen to create a city planning commission."

A Successor for the Late M. Despradelle

Advices from Paris to President Maclaurin's office announce that the two vacancies in the department of Architecture at the Massachusetts Institute of Technology have been filled, the men coming to the Institute being Frenchmen and graduates of the Ecole des Beaux Arts. The vacancies in question are those caused by the death of Professor Despradelle and the resignation of Allen H. Cox.

The selection of suitable men for the department was given to Professor H. W. Gardner, who went to Paris early in the year. Looking carefully over the men available and in consultation with members of the Technology corporation who were in Europe, Professor Gardner recommends Jean Frederick Weilhorski, of Tours, for successor to Professor Despradelle and Albert LeMonnier, of Paris, for the other place.

M. Weilhorski, whose title at Technology will be Rotch Professor of Architectural Design, is a practising architect of Tours. He is about forty years of age, with an English-speaking wife and a little daughter. His record, which will appeal to architects and to architectural students, includes four years (1894-98) at the Beaux Arts, and his subsequent awards are, in 1900, the second Rougevin prize, the next year he gained the Godeboeuf prize and in 1902 the Prix Labarre. His fourth consecutive award, in 1803, was the second Grand Prize of the school, and at various times he received medals for projects, sketches, and in archæology. In 1900 he was designated laureate of the Central Society of French Architects, and the honor was repeated in 1902.

M. LeMonnier, whose title at Technology will be assistant professor of architectural design, is a young man, not yet thirty, unmarried, and not as yet speaking English. He was admitted to the Beaux Arts in 1903 and selected for his master H. M. Héraud. It is the custom in the French school for the students to associate themselves with some one of the great masters, and there comes from this a directness of contact that makes for the career of the young man. M. LeMonnier has received more than fifty awards in the various competitions related to the school. He holds two medals in school problems, and in the Concours Rougevin and the Concours Godeboeuf. For sketch competitions he has two medals and three first mentions, he holds two medals on problems in archæology and two on problems in decorative composition. He has received one medal each in modeling and perspective and thirty-eight other mentions.

With Professor James Knox Taylor for its head and such excellent replenishings of losses and the continuance of the strong instruction force that it retains, the Technology department of architecture should continue the excellent and forceful work for which it has so long been noted.